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# REPORT

OF THE

## COMMISSIONER OF THE INTERIOR FOR PORTO RICO

TO THE

*From*

SECRETARY OF THE INTERIOR, U. S. A.

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1903.

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WASHINGTON:  
GOVERNMENT PRINTING OFFICE.  
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DEPARTMENT OF THE INTERIOR OF PORTO RICO,  
OFFICE OF THE COMMISSIONER,  
*San Juan, October 1, 1903.*

SIR: Your letter of date June 27, 1903, addressed to the governor of Porto Rico, inviting attention to section 24 of the act of Congress, approved April 12, 1900, entitled "An act temporarily to provide revenue and a civil government for Porto Rico, and for other purposes," and requesting that the matter be brought to the attention of the commissioner of the interior, with instruction for him to prepare and forward, through the governor, for your consideration, a report of affairs pertaining to Porto Rico with which he is charged under existing laws, and containing suggestions concerning the character and arrangement of the same, has been received by reference from the governor, and in conformity therewith I have the honor to submit my fourth annual report as commissioner of the interior for Porto Rico.

The organization of the department of the interior was continued throughout the fiscal year as stated in my last annual report, to wit: The office of the commissioner, embracing the divisions of public lands and forests, and archives, and the bureaus of public works, health, telegraph, agriculture and mines, and docks and harbors. On July 1, 1903, the division of lands and forests was, because of the prospective extension and greater importance of its functions, denominated a bureau, and is being organized as such.

### PUBLIC HIGHWAYS AND BRIDGES.

The bureau of public works, by reason of its near relation to the people in the interests that most closely affect their well-being, in the employment of labor and expenditure of money, usually at times and in places when and where most needed, easily ranks first among the several departmental divisions of duty. In past reports I have dwelt upon the subject of roads and their necessity as the prime factor in the material development of the agricultural interests of the island. The soil of Porto Rico is so very fertile and so well adapted to the cultivation of so great a variety of products that to assert that the restoration of prosperity and the accumulation of wealth depend upon the development of the agricultural interests is but the repetition of a fact patent to all observers. Wherever we have been able to lay down roads

their value has been speedily demonstrated by the instant quickening of agriculture in those communities, and good results are apparent, not merely upon the face of mother earth, but may be traced in the improved appearance and more industrious habits of the people.

The island of Porto Rico is only about 100 miles long by 47 miles wide; it contains less than 3,600 square miles of territory, yet the census of 1900 showed a population of 953,000 people, an average of 265 persons to the square mile. There are, however, only four cities claiming a population in excess of 10,000, and none of over 35,000. It is plain to be seen that the population is principally rural; that the people must depend upon the cultivation of the soil for a livelihood, and to thrive they must have means of transit to the seacoast for the sale or exchange of commodities.

For centuries the most of the interior communities had no better means of exit than over very ordinary trails, narrow, rocky, rough, precipitous, and dangerous. It was not possible to pack fruits or perishable products over them, so that for trade or traffic with the outside world the people were reduced to the necessity of cultivating coffee or tobacco, not always profitable, seldom so with the great expense of getting to market.

It is a pity and a shame that during the four centuries of time immediately preceding American occupation so very little effort was made to open up communication; that so small a portion of the millions of dollars wrung from the people in taxes and imposts should have been spent in the betterment of roads, for education, or any other useful purpose. Pompous officials came, ruled with vigor, tarried a little while, and departed with a competency of ill-gotten gains, leaving the unhappy native to labor and to suffer. Such loyalty, such devotion, under such conditions, deserved the deliverance that every true-hearted Porto Rican prayed for and may now enjoy.

Road construction, repair and improvement, and bridge building, were immediately taken up by the military government in 1898, and there has been no cessation of earnest endeavor to carry relief to needy communities. The great work is by no means even nearing accomplishment. There are yet a number of interior towns whose only outlets are over the ancient trails, but they are being approached as rapidly as means and facilities at command will permit. The interior is mountainous, precipitous and rocky, the gorges are deep, the streams numerous and, at times, torrential. Road construction is slow work and, at best, very expensive. Where to build, how, and which first, present serious, perplexing, and delicate problems for solution.

The very able and exhaustive report of the superintendent of public works, herewith presented (Exhibit A), shows that the bureau has addressed itself intelligently and industriously to the accomplishment of its task. The total amount disbursed by the bureau for salaries, labor, construction of new roads and bridges, maintenance and repair of highways and public buildings, surveys, contingent and incidental expenses during the fiscal year 1902-3, was \$732,607.

The total number of kilometers (a kilometer is about five-eighths of a mile) of completed first-class road in existence on July 1, 1903, was 444.1, of which 284 kilometers were constructed during the Spanish regime with State funds at a total cost of \$3,896,196, an average rate of \$13,719 per kilometer. The total cost of construction of the 160.1 kilometers of first-class road, including all expenses of land damages,

surveys, supervision, and contingencies, by the American military and civil authorities, was \$1,443,819, an average of \$9,024 per kilometer, under an increase in the price of labor and material. The difference of \$4,695 per kilometer is material, but can not be explained.

Since July 1 there have been added for maintenance 128 kilometers of road, making a total of 603.5 kilometers now under maintenance, which it is expected to increase to 707.5 kilometers by the end of the calendar year.

The superintendent treats at length of the cost of maintaining roads. True, the expense has been reduced from \$1,000 per kilometer in 1899 to \$537 during the past fiscal year, yet it is recognized that this figure, in view of additions annually made to the mileage of roads under maintenance, is too high—higher than the revenues of the insular government warrant—and forces consideration of ways and means to reduce the cost. Study of data collected from all available sources leads to the conviction that the best results are likely to be secured by contracting the whole or portions of the work. Many of our roads are not yet in shape to permit of the advantageous employment of this method, but the question threatens to assume such a serious aspect in the very near future that I am disposed to seek legislative authority to try the experiment on some of the principal roads.

The list of new roads built and old ones repaired and improved is a long one and a good index to the progress of work undertaken and accomplished by the bureau. On account of the fact that the trust funds appropriated by Congress are running low and need to be scrupulously husbanded, and the very strong demands, made often with show of impatience, for road relief, together with a realization of the fact that the construction of first-class roads is not only slow work, but not always necessary to meet the requirements of traffic, we have felt compelled to make general repairs on a number of roads, and by curing bad places put the roads in fair condition for travel in all kinds of weather. This kind of work has given good satisfaction, and has resulted in carrying relief to many communities sooner than they had hoped to obtain it.

The salutary effects of road extension are marked and edifying. From the finished roads the ancient broad-tread, high-wheel ox cart is slowly but surely disappearing, and the lighter, cleaner, and more scientific construction, the American wagon, is coming to the front. The economic value is plainly demonstrated in the greatly reduced cost of transportation to and from the interior. This saving is figured at from 50 to 70 per cent of the former cost, and in some instances it is much larger. From the town of Utuado, located in the center of an extensive coffee section, the regular charge for carrying 100 pounds of coffee by pack train to Arecibo, the seaport town, over the old trail, was \$1. Now, over a well-built highway, through a country rivaling the most beautiful sections of far-famed Switzerland in scenic effects, a team of mules hitched to an American road wagon hauls a full load at 10 cents per 100 pounds. The cane growers in the Arecibo Valley, who formerly paid 10 cents per 100 pounds for hauling their sugar to the railroad station, now pay only 3 or 4 cents per 100, and save thousands of dollars annually. It certainly behooves the officials, insular and municipal, to bend every energy to the construction of roads, and it is to the credit of all concerned that the department of the interior has been generously supported in its endeavors to supply this great need.

The country road law passed by the general assembly and approved March 1, 1902, has been slowly getting into operation. The need of waiting until November for the election of supervisors in each of the seven districts created, the time taken for organization, and the unfamiliarity of the supervisors with the law and their duties have caused delay. The law prescribes a decided departure from methods heretofore in vogue for expending road funds. It is intended to be so restrictive that all moneys received shall be intelligently expended for the purposes specified and fully accounted for. It provides for the payment of 25 per cent of the taxes collected from the real and personal property in the rural districts of each municipality by the insular treasurer directly to the treasurer of the board of supervisors of the road district. The several boards should receive annually about \$75,000, a sum sufficient, if wisely and economically administered, to maintain and repair many kilometers of road. The bureau is extending every possible help to the boards in the arrangement and prosecution of their work.

The legislative assembly of 1903 passed an act providing for the employment of convicts in the construction of two designated sections of road. The law is simply experimental, but careful preparations have been made to carry it into effect, and it is hoped that the demonstration will prove its utility and wisdom.

The report of the superintendent is replete with information of value. The subject-matter, as relating to progress in the upbuilding and development of the country—not new, but in need of great changes in order to bring it into conformity with republican ideas and afford the people the means and opportunities for helping themselves to prosperity, comfort, and happiness—will be of interest to the many people at home whose patriotism and national pride prompt them to keep in touch with the development of the policy of government in Porto Rico.

A number of photographs accompany the report of the superintendent. These, it will be noted, are illustrative of the interesting story related. The reports of this department, by reason of the numerous branches of work and subjects of popular interest embraced in its organization, are solicited from all parts of the United States, and through correspondence arising out of reading the reports I am advised that particular value has been attached to the illustrations heretofore inserted, especially those of roads, road work, and views of the interior. I recommend, therefore, that the photographs herewith submitted be inserted in the published report.

#### PUBLIC HEALTH.

With an average monthly temperature ranging from 72.7° to 88.3°, never higher than 92.68°, nor lower than 66°, as is shown by the records of the San Juan station of the United States Weather Bureau for the year 1902; with a refreshing northeast trade wind sweeping almost continuously over the land, and with the minimum of swamps or morasses to breed malarial diseases, it will be conceded that the natural sanitary conditions in Porto Rico ought to be healthful. They are, and the source of prevailing diseases are easily traceable to habits of living and sleeping, uncleanness of person or surroundings, impure or insufficient food. Upon the superior board of health rests the duty



and responsibility of removing, curing, or correcting those evils, and to the performance of that duty under the intelligent, vigorous, and enthusiastic leadership of its competent and courageous president, it has successfully addressed its best efforts.

The report of the director of health (Exhibit B) shows substantial progress in sanitary matters in spite of difficulties encountered in the administration of the laws and regulations. One most annoying impediment to progress has been found in the attitude of municipal officials toward the health board. A defect in the law relating to local health officers puts it in the power of the *alcalde* (mayor) to remove or force the resignation of the health officer. The interest taken by the *alcaldes* in the duties of any official whose appointment they do not control is usually so small and the salaries provided for are so meager, with uncertainty of payment added, that it requires a superabundance of zeal and local pride in the individual to induce him to brave the criticisms and accusations arising out of the faithful and fearless performance of duty. These conditions seriously interfere with good service, and in consequence thereof the people, particularly the poor of many municipalities suffer and die for want of proper attention. It is expected that the next session of the legislative assembly will take steps to remedy this evil, and by proper enactment compel delinquent municipalities to hearken to the counsel and obey the lawful orders of the superior board of health.

It is to be considered that the advent of civil government found the majority of the municipalities in a bankrupt condition, from which none has fully recovered, and the most of them remain miserably bad. As a result, the hospital accommodations, even in the few towns where pretense is made of providing them, are sadly deficient, so that the sick poor who have not the means to employ medical attention are left to sicken, die, or recover, as nature wills or native remedies fail or avail. A great field lies open in Porto Rico for the exercise of philanthropy by generously disposed wealthy persons in the States. Money could nowhere accomplish greater good for a larger number of afflicted and suffering people, could nowhere be more certainly bestowed to insure blessings and satisfaction to the great-hearted giver than in the erection of hospitals and making provision for their proper maintenance in the interior towns of this beautiful island. I would that these words might prevail with some rich citizen to set the worthy example by a generous donation.

The matter of food inspection has occupied the active attention of the board during the year. At one time it seemed to be taken for granted that any kind of old food stuff was good enough for Porto Rico, and shippers had the habit of sending here the refuse of the markets in the States, usually on consignment, and to be sold for what it would bring. Through the rigid enforcement of strict regulations the ports of this island have ceased to be a dumping ground for such stuff, except the little that finds its way to the bottom of the sea after examination and condemnation. Flour and codfish, the leading staples, are now, almost without exception, of good quality. In regulations recently issued by the board for circulation abroad, special care is required in branding and marking packages containing articles of food, and standards of purity are designated. It is recognized that all persons can not afford food of the highest grade, but the board is determined that no one shall be deceived.

The proper drainage of cities and large towns has received merited attention. The sewer system of San Juan is about complete. Orders have been issued for all houses to be connected with the sewer, and the work is being pushed with all the vigor that the city's force of licensed plumbers will permit. Very few of the old and filthy cisterns are now in use, and as the aqueduct water is of fair quality, there has been a marked decrease in the number of cases of gastro-intestinal disease in San Juan. The water supply of the city is, however, limited, and the rapid increase of consumption forces consideration of enlargement of the supply, a serious proposition, because it will involve heavy expense. The plan of service through meters, and high rates, check consumption, but the saving is not equal to the increase, besides, in preventing the free use of water it is opposed to cleanliness.

Porto Rico has been singularly fortunate during the past year in the matter of contagious diseases. Only 103 cases of smallpox were reported during the year; nearly all were of a mild type of varioloid and none resulted fatally. No case of yellow fever occurred and no epidemic of any description afflicted any community. Tuberculosis continues prevalent, and no marked diminution of its ravages need be hoped for until the people can be brought to a realization of the faults and dangers of their habits of living, and be induced to adopt proper means of prevention.

#### AGRICULTURE AND MINES.

If nearly a million of people were compelled to depend for subsistence upon the possible product of less than 3,600 miles of territory, be it ever so fertile, the methods of culture ever so scientific, the implements employed ever so modern, and good markets ever so convenient, one would expect to find the masses poor, decrepit, and starving. But when that number of people have less than half of that territory under cultivation, have no knowledge of proper methods, employ the most ancient of tools, and have no kind of market, if they needed one, what then? Yet that was the condition of the rural population of Porto Rico five years ago, and it is barely beginning to improve. How they existed and continued to multiply and replenish the earth is marvelous. To the bounteousness of nature in providing wild fruits and the fertility of the soil in hurrying into life and to maturity the seed dropped, barely covered and left to chance, are due the credit.

The bureau of agriculture and mines is old in existence, but the records fail to show that it has been more than a name. Politicians here, as elsewhere, express much sympathy for the poor agriculturists, but their assistance ends there. The farmers of Porto Rico need to be taught how to farm and encouraged by every means at command to plant and cultivate those things that command a profitable price in the market. With a small appropriation the bureau has undertaken to place valuable information before the farmers. This is done through the medium of monthly bulletins, published since July of last year.

The report of the assistant commissioner (Exhibit C) treats entertainingly of matters relating to the agricultural interests of the island. It shows a very considerable increase in the production of sugar and molasses. This was to be expected. The cane lands of Porto Rico are comparatively fertile and cheap, and the removal of the duty on sugar allows a fine margin for profit. The strong probability of the erection

of several central factories during the next year is regarded as an assurance that the sugar industry will take good care of itself.

Coffee, once the leading item of export and the source of wealth for the fortunate owners of plantations, has passed through many vicissitudes during the past decade. First the price dropped from 25 and 30 cents to 8 and 10 cents per pound; then the disastrous hurricane of 1899 completely ruined or seriously injured fully three-fourths of the plantations on the island. The owners, who had lived improvidently during the years of prosperity, were deeply in debt before the hurricane came, and after it had passed along they sat penniless, bankrupt, and discouraged amidst the ruins of their homes. Many of them abandoned their plantations and sought other employment; some have struggled along, restoring patches as they could and eking out a miserable existence on the crop gathered, while the more fortunate few found assistance and through it have been enabled to bring their places back into fair bearing form. There has been very little new planting.

The average annual production of marketable coffee prior to the year 1899 was estimated at 26,380 tons; for 1899, picked subsequent to the hurricane, 6,700 tons; for 1900, 9,200 tons; for 1901, 16,725 tons; for 1902, 19,825. The crop of 1903 promises to be an exceptional one, possibly equal to the average prior to 1899. The planters are, however, discouraged by the prospect of low prices, due to the heavy duties laid by France and Cuba, whence the bulk of our coffee goes. There is no profit to the planters with coffee at present prices; should they go lower, the situation will be distressing.

The only hope for relief seems to lie in a possible demand from the States. The quality of Porto Rican coffee is immensely superior to the South American product, equal in strength and flavor to Mocha or Java. It deserves the favor of lovers of good coffee, and as the only coffee grown on United States territory it should be preferred. It has not, as yet, been possible to introduce it through the regular channels of trade, and no dealers have shown readiness to make a specialty of it, because of the fact that the crop is controlled by comparatively few buyers, who appear to prefer shipping it to Europe.

During the Spanish régime and in conformity with the strict policy of Spain to prevent the establishment of trade relations between its colonies and any other country, unless forced by circumstances to allow it, and then not without compensatory advantages to the home Government, the manufacture of cigars for export was not permitted in Porto Rico. Tobacco might be grown and shipped in the leaf to Cuba, whence it found its way as Havana cigars to the States. Porto Rican grown tobacco is equal in flavor to the Cuban product, so that while the deception was harmless, injustice was done to Porto Rico in depriving her people of employment and profit. Now, however, the manufacture of cigars is a thriving industry, the exports in 1901-2 amounting in value to \$1,549,235, and in 1902-3 to \$1,753,917.

The area planted to tobacco has been largely increased. The yield this year was normal, but a considerable portion is being held for better prices. On account of the large increase in the manufacture of cigars there resulted a shortage of wrappers, and the experiment of cultivation under shade was tried with marked success, the quality being superior and the yield larger.

Surprise has been expressed that a country so advantageously located, with a climate so perfect, no danger from frosts, with a soil

so fertile and producing a great variety of luscious fruits, mostly grown wild, should never have attempted to cultivate fruit for export. Indeed, there ought now to be numerous fast steamers carrying fruit from Porto Rico, as from Jamaica, to New York, Philadelphia, and Boston. But there are not, and for the same reason that cigars were not formerly manufactured for export. Had the poor farmers of Porto Rico, years ago, been permitted and encouraged to cultivate fruit, and allowed to export it to the United States, it is possible that the happy relations thus established would have hurried the day of deliverance. Anyhow, I dare to assert that the army of occupation would have found here a rich and prosperous people instead of the poor and suffering masses that greeted the advance columns.

But these conditions are destined to change, and rapidly. The prediction of my first annual report that within ten years fruit would constitute the most valuable item of export promises to be verified. It seemed slow to begin, but now that the planting of oranges, grape fruit, lemons, pineapples and other citrus fruits has begun, the area is rapidly enlarging. There will be some cultivated oranges shipped this season, and the volume will swell by bounds. This is not a fancy, for the trees are planted and approaching the bearing age.

The planting of fruit trees was at first confined to the vicinity of San Juan, but is extending over the island. From Adjuntas, Aguas Buenas, Bayamon, Carolina, Lajas, Manati, Mayaguez, Naguabo, Ponce, Rio Piedras, Toa Alta, and Vega Alta groves of importance are reported. There are, at least, 10,000 acres of land planted to citrus fruits, and hundreds more are being prepared for planting this fall. One nurseryman holds contracts for putting out more than 35,000 trees. That handmaid of fruit culture, the canning factory, has appeared. One was established at Mayaguez last year and reports a highly profitable season. Its capacity is to be largely increased.

The cultivation of sea-island cotton, at one time, it is claimed, a profitable industry, but permitted to languish and die, is attracting attention. The representative of an American cotton company had tests made a couple of years ago, and with such success that a quantity of pure seed was procured from the Caroline Islands, planted, and the crop promises well. It is estimated that about 10,000 acres of ground are in cotton; the crop is now maturing and the first bale was recently shipped to New York. The confidence of the farmers in the certainty of the profitableness of this industry is so great that applications for seed exceed the supply.

The cultivation of the cassava plant, heretofore grown only in small patches for food and starch, extracted in a crude way, may receive impetus. Cassava starch is easily made and it is of high grade. It is preferred to corn starch for all purposes, especially in the preparation of smokeless powder, of which starch is the largest ingredient. There is strong probability of the erection of one or more large starch factories on the island.

The location of a United States experiment station on the "Carmen" estate at Mayaguez, a tract of fine land belonging to the insular government, will certainly prove of benefit to the agriculturalists. The cultivation of every known and obtainable variety of fruits, roots, and plants adapted to tropical growth will be attempted and the results published for free distribution among the farmers and planters. It will be possible, too, for any one contemplating the growing of any

kind of crop to obtain information concerning the character and needs of his soil and the best methods of cultivation. All in all the station must prove an important factor in the agricultural advancement of Porto Rico.

#### INSULAR TELEGRAPH.

It is recorded in history that in Porto Rico, over experimental lines extending from the town of Arroyo on the south coast to a plantation some 8 or 10 kilometers away, Prof. S. B. F. Morse tried, tested, and improved his great invention before, it is claimed, giving it to the world. Possibly as the outgrowth of pride felt in that circumstance the people seem to entertain a particular affection for the telegraph service. The army of occupation found a system established throughout the island extending to the smallest and most isolated villages owned and controlled by the government. It was in a bad state of repair, the old Morse tape instruments were in use, and their manipulation so much of a mystery to many of the so-called operators that they often found it convenient to send messages by mail, and let it be recorded, as an excuse for slow delivery, that the lines were down.

The United States Signal Corps quickly changed conditions, however, by the substitution of modern instruments and expert operators, the number of stations being gradually reduced from about sixty to ten during the period of military occupation, and the system as reduced transferred to the insular government on February 1, 1901. The total length of line now in use is 1,231 kilometers; number of stations, 32; employees, including managers and operators, 42; clerks, 2; linemen, 7; messengers, 12; total 63, of which 10 are Americans. The demand for additional stations at interior towns continues strong, and does not go unheard, but will be satisfied as quickly as conditions will permit.

A scarcity of operators has existed from the beginning. The bureau has offered to young men and boys every opportunity under its control to take instruction, with the assurance of remunerative employment when they could prove proficiency. Quite a number, but not as many as would warrant further present extensions, have taken up the work. A year ago we opened a telegraph school for young ladies, attendance limited to 25. The bureau was overwhelmed with applications and experienced much difficulty in making selections. The school has prospered; the pupils have shown remarkable aptitude. Some of the brighter ones have been given positions and are rendering good satisfaction. The school will be continued as a help in extending and maintaining the system until the necessity for its further existence shall have disappeared.

The occurrence of annoying discrepancies in the transmission and receipt of messages made necessary the establishment of a standard time service. A chronometer was procured and the service was installed at the San Juan office March 1, 1903. Daily at 12 o'clock noon the time signal is transmitted to every station on the island. In nearly every municipality the town clocks are now set to the standard, and complaints of slow delivery are no longer made. The time used is that of the sixtieth meridian, designated as intercolonial time.

As an experiment in government ownership of the telegraph the progress in Porto Rico is interesting. In the first place the service is conducted on business principles, operators are held to the prompt and faithful performance of their duties, and the need of correctness and

secrecy is drilled into them. As a result the telegraph has the confidence of the business community and is popular with all classes. The very comprehensive report of the superintendent (Exhibit D) shows not only a steady and gratifying increase of receipts, but that the system is actually producing a profit. The earnings of the lines, including free official business, for the fiscal year 1902-3 exceeded by \$13,914.46 the total cost of operating and maintaining the system, and by \$1,876.45 the amount expended for all purposes—salaries, new lines, reconstruction, maintenance, material, and incidentals. Yet this service was taken over by the insular government in February, 1901, under the assurance, not questioned with the figures before us, that it would continue to be a source of expense. The credit of success is due to splendid management by the capable superintendent and the efficiency and loyalty of the employees.

#### DOCKS AND HARBORS.

The bureau of docks and harbors was organized July 1, 1902, in appreciation of the urgent need of the supervision and regulation of commerce, as well for the protection and accommodation of shippers, and as a source of revenue for the government. Prior to that date a captain of the port had been appointed at San Juan, and some attempt had been made to enforce the rules and regulations formulated by the commissioner and approved by the executive counsel, but the need of a bureau embracing in its organization all of the ports of the island was made apparent and means were taken for its establishment.

The commissioner was fortunate in being able to secure the services, as chief, of a gentleman whose experience in the customs department had given him accurate knowledge of the shipping interests and comprehensive ideas of the requirements of the bureau and its relation to the commerce of the island. The work of organization was promptly taken up at the three principal ports, San Juan, Ponce, and Mayaguez, and the business of the bureau has progressed smoothly and satisfactorily. Some friction arose in the beginning on account of objection by vessel owners and shippers to the payment of the fees and charges provided for and demanded. This, however, was expected. For several years they had enjoyed the free use of government property without cost, and it was but natural, as humanity runs, that they should object to paying rent. But those difficulties were speedily adjusted.

During the year various sums of money have been expended on repairs to the bulkhead at San Juan and the wharf at Mayaguez; also for the construction of a new passenger wharf at Ponce Playa, and the purchase of a steam launch for official service in the harbor of San Juan. All expense was paid from the collections, which for the fiscal year amounted to \$25,362.68.

The shipping interests of the port of San Juan are growing rapidly. During the past fiscal year 510 vessels, steam and sail, exclusive of numerous coasters, entered the harbor and remained an average of four days. The docking facilities are sadly inadequate, and notwithstanding the fact that the pier of the New York and Porto Rico Steamship Company, burned three years ago, is being rebuilt, there is a crying need for more piers. That they could be erected and operated with profit to the Government, is susceptible of easy demonstration.

The bay of San Juan, while covering a considerable area, is so largely

shallow, the channels so narrow, and the anchorage ground so restricted that the dredging of certain points can not be further delayed without serious inconvenience and detriment. This is a matter of Federal control, and I most respectfully recommend that it be called to the attention of Congress to the end that a sufficient appropriation for beginning the work may be considered and found worthy of entry in the river and harbor bill.

The report of the chief, bureau of docks and harbors, herewith submitted (Exhibit E), states in detail the organization and operation of the bureau, with statistics and recommendations of value.

#### PUBLIC LANDS.

In my report for 1901-2 I dwelt upon the subject of public lands, making particular reference to the act of Congress of date July 1, 1902, which authorized the President, within one year, to make such reservations of public lands and buildings belonging to the United States as he might deem necessary for military, naval, light-house, marine-hospital, post-offices, custom-houses, United States courts, and other public purposes, and providing that all remaining public lands and buildings, not including harbor areas and navigable streams and bodies of water and the submerged land underlying the same, be granted to the government of Porto Rico, to be held or disposed of for the use and benefit of the people of the island.

The President has performed the duty imposed upon him, except in the matter of one reserve asked by the Navy Department, which is held under advisement, and the insular government has acquired the right to possession of public lands aggregating, as estimated, about 104,000 acres, scattered over the island, and most of it of questionable value. The law and the action of the President have, however, settled many questions of disputed title, and while there is disappointment over the success of the War and Navy Departments in obtaining a larger portion of lands on the islet of San Juan than it is felt are really needed by either of those Departments, or than can be so appropriated without serious injury to the material interests of the city, it is to be hoped that compensatory advantages to the island may appear from some other direction as time passes.

The bureau of public lands was organized on July 1, for the purpose of taking over all public lands and perfecting arrangements for their location, classification, and survey. No regular or comprehensive survey of the lands of Porto Rico has ever been made, and while good titles can be obtained, but at large expense, the descriptions of tracts are faulty, having to depend too much upon streams, witness trees, and names of adjoining land owners. The courses of streams have been diverted, alleged witness trees have disappeared, and the names of individuals long dead have passed into oblivion. Confusion and uncertainty must result. A complete survey of the whole island is necessary, and since it can not be thrown into square sections and their subdivisions, because of the general ownership of lands in irregularly shaped bodies, the boundaries of each tract should be determined and recorded. This subject will be submitted to the consideration of the legislative assembly and request made for a sufficient appropriation to prosecute the work.

In the division of archives excellent progress has been made toward

the complete and systematic arrangement of documents. To make room within the limited space available for filing the valuable records and papers of past administrations and for future accessions, a careful inspection of all the files was instituted and many tons of useless trash, such as old lottery-ticket stubs and various expedientes, never of any value and now practically past reading, were destroyed. It is possible now, under the very complete system of indexing and filing, to determine readily whether or not documents referring to any particular case have been preserved, and if so, where to find them.

#### CONCLUDING REMARK.

In the conduct of the business of this department the rule adopted upon its organization, as both just and in accord with the express desire of President McKinley, and confirmed by President Roosevelt, to give worthy and competent natives the preference in the selection of employees has been strictly adhered to. No foreigners, with knowledge of the fact by the department, have been employed, and no Americans except in positions where the introduction of new systems or the prosecution of particular classes of work required the services of men specially qualified, and such were not locally obtainable. The force regularly employed in the several branches of the department of the interior aggregates fully 1,200 persons, at least 95 per cent of whom are native-born citizens of Porto Rico. To their loyalty, integrity, honesty, and devotion to duty too high tribute can not be paid, and this applies to all, from the highest salaried official to the smallest paid laborer. Whatever of success may have been attained along the many lines of work under the supervision of the commissioner, the credit for it belongs to the employees, whose efficiency and industry have made progress possible, and it will be one of the chief pleasures of my future life to contemplate the years of duty performed in Porto Rico, and to recall with gratitude memory of the valuable assistance so freely and kindly contributed by those whom I have been so fortunate as to have labored with in the interesting work of helping the people to reach the goal of their heart's desire—American citizenship—and in the upbuilding and prosperity of the country.

Very respectfully,

WILLIAM H. ELLIOTT,

*Commissioner of the Interior for Porto Rico.*

HON. ETHAN ALLEN HITCHCOCK,

*Secretary of the Interior, Washington, D. C.*

(Through the Governor of Porto Rico.)

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*List of photographs accompanying report of the superintendent of public works of Porto Rico for the fiscal year 1902-3.*

1. Mavilla River bridge, after placing concrete arch, February 17, 1903.
2. Old road between Ponce and Guayama.
3. Repaired road between Ponce and Guayama.
4. New road between Utuado and Adjuntas. ("Tallones.")
5. New road in construction between Bayamon and Comerio.
6. New (unfinished) road between Yabucoa and Maunabo.
7. Old road between San Sebastian and Lares.
8. Rock blast on the road in construction from San Sebastian to Lares.
9. Old-fashioned road roller, Bayamon and Comerio road.
10. Repaired road between Fajardo and Luquillo.



# EXHIBITS.

## EXHIBIT A.

### REPORT OF OPERATIONS OF THE BUREAU OF PUBLIC WORKS FOR THE FISCAL YEAR ENDING JUNE 30, 1903.

BUREAU OF PUBLIC WORKS OF PORTO RICO,  
*San Juan, P. R., August 17, 1903.*

SIR: I have the honor to submit herewith a report of operations of this bureau for the fiscal year ending June 30, 1903.

The principal work during the past year consisted in road work, new construction and repairing, and, incidentally, in the maintenance of such roads as have been finished. There was relatively no extensive bridge building and no new construction in the line of public buildings, though both are very much needed. That the bureau was not idle, however, is plainly shown by the disbursements made during the year, which amounted to \$732,607. Of this amount \$394,900 were paid from the so-called "Trust fund for public and permanent improvements, from the general allotment of appropriations of revenues collected on importations from Porto Rico," specially allotted for the construction and repair of country roads in Porto Rico, and \$337,707 from the regular budget appropriations approved March 1, 1902. The principal items for which this money was disbursed were, expressed in round numbers, for salaries of permanent employees, including the regular force employed on maintenance of roads, about 900 men, \$169,196; for contingent and incidental expenses, including expenses for special survey of lands and buildings, \$7,358; for maintenance and repair of roads, budget and trust fund appropriations, \$228,716; for construction of new roads and bridges and other auxiliary works, \$264,146; for maintenance and repair of public buildings, \$47,091, and for expenses at executive mansion, \$16,100.

There were constructed during the past year 9 kilometers of new roads; about 29 kilometers are under construction. On the many old roads which are now being reconstructed, which in many cases is tantamount to entirely new work, about 11 kilometers were finished, so that the total number of kilometers of finished roads was, on July 1, 1903, 444.1 against 424.1 of the previous year.

Since that date 128 kilometers have been added for maintenance; which makes the total to be maintained at the beginning of the fiscal year 1903-4, 603.5 kilometers. Before the end of the present year it may reach a total of 707 kilometers.

Of the total of finished first-class roads, 284 kilometers were constructed under the Spanish Government with State funds, at a total cost, according to the available records, of \$3,896,196, or at the rate of \$13,719 per kilometer. The cost of the many kilometers of roads built by municipalities could not be ascertained. The total expense for the construction of 160.1 kilometers of first-class roads, including all expenses for land damages, surveys, supervision, and contingencies finished on July 1, 1903, under the American military and civil governments, was \$1,443,819, or at the rate of \$9,024 per kilometer. I leave it to the historian to find out whether this great difference of \$4,695 in favor of the American engineers, notwithstanding the great increase during the past three years in the price of labor and material, is attributable to a difference in the method of construction or to a more economical and sincere management.

The division of the duties of the bureau has remained practically the same as during the preceding year, with the exception of those pertaining to harbors and docks, which were transferred to a new bureau. In the division having charge of maintenance of roads it became necessary to establish a third district, with headquarters at Mayaguez, in charge of a young engineer who, like the district engineers at San Juan and Ponce, acts also as inspecting and consulting engineer in connection with all classes of public works in his district which are referred to the bureau.

The assistant superintendent at bureau headquarters has special charge of matters relating to repair of roads and to work done under the new country-road law and prison labor, and makes the preliminary examination of all projects submitted for new work by individuals, corporations, and municipalities authorized by the executive council.

A civil engineer, under the title of general inspector, assists in the office in the preparation of new plans, and makes periodical inspection of all work in progress.

The special surveys carried on by the bureau for this and other departments are made under the direction of an engineer whose long experience during the Spanish régime in that line and his knowledge of historic facts and events makes his services exceedingly valuable.

While no opportunity has so far arisen for the bureau to call the dormant talents of some of the members of its staff into action regarding the designing or construction of public buildings on a large scale, I am convinced that should opportunity offer the result would not be disappointing. Meanwhile, the repairs and maintenance of public buildings are in the hands of an architect who, in the prompt fulfillment of his duties and by his economical management, has shown the extensive practical experience needed in his profession.

Of the other gentlemen in the office, of the clerical and drafting force, I have the highest praise to give for their unvaried and earnest application to their work. Their work has been steadily increasing; there was no slacking up in the amount of it and no rest, except on enforced holidays.

The excellent condition of the pay division has been commented upon, I am pleased to say, by the governor and the auditor, and I can not do better than to refer to the separate report rendered as to the detailed amount of work done by the disbursing officer, which is attached to this report under Appendix D.

The organization of the field forces for maintenance of roads, construction of roads and bridges, and surveys, is about as economical and satisfactory as it can be made under present conditions. There were mistakes made occasionally, especially in construction work, but they can be ascribed more to the inexperience of the young engineers and not to any flagging of interest in their work.

The subject-matter of this report is treated under the following captions:

#### I. Roads and bridges:

1. Maintenance.
2. Construction of new roads and reconstruction of old roads—A. New construction. B. Reconstruction of old roads.
3. Special road districts fixed by law, and providing for the building, maintaining, and repairing of country roads.
4. Construction of roads with convict labor.
5. Surveys and examinations for new roads and bridge sites.
6. Bridges.
7. Recommendations as to roads and bridges.

#### II. Public buildings and lands:

1. Maintenance and repair of public buildings.
2. Surveys and records of harbor lands, public buildings, and adjacent grounds.
3. Construction and supervision of public works for other insular departments.

#### III. Franchises and examinations of new projects, private, corporative, and municipal.

Accompanying the report are:

Map of the island of Porto Rico.

Appendix A, report of the district engineer at San Juan.

Appendix B, report of the district engineer at Ponce.

Appendix C, report of the district engineer at Mayaguez.

Appendix D, report of the disbursing officer.

Appendix E, report of supervisor of public buildings.

Appendix F, report of assistant superintendent on franchises, etc.

Exhibit I, synopsis of disbursements on account budget.

Exhibit II, synopsis of disbursements on account of special appropriations.

Exhibit III, synopsis of disbursements on account "Trust fund" up to June 30, 1903.

#### I. ROADS AND BRIDGES.

1. *Maintenance.*—To provide for a closer supervision of the work and a more ready communication between the executive centers and the points of operations, the island is now divided into three districts, each one in charge of a supervisor, now called district engineer, residing at San Juan, Ponce, and Mayaguez, respectively. With the rapid approach of the completion of the principal trunk lines and lateral roads it will soon be possible, if the present system of maintenance is retained, to reduce the number of districts again to two or probably one.

The detailed operations carried on in each district and the respective amounts



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expended by each supervisor are embodied in separate reports added to this report as Appendixes A, B, and C. I give these reports as presented to me, to show not only the characteristic way in which each supervisor presented and treated his subject upon a prescribed basis, but also the laudable progress made by these young men in mastering the English language. The report of the engineer in charge of the San Juan district is especially commendable.

In reviewing and summarizing these three reports it should be noticed, first, that the total length of roads maintained during the year, viz, 444.1 kilometers, was 20 kilometers more than the previous year, and the number is constantly increasing. Quite recently about 128 kilometers have been added, and we are beginning the new fiscal year (1903-4) with the following finished and partly finished roads, of which 603.5 kilometers are now (August 15) in maintenance:

TABLE NO. 1.—*List of insular roads in maintenance and construction, July 1, 1903.*

[Zero begins at first-named points.]

No.	Road.	Total length.	Finished length.
		<i>Kilometers.</i>	<i>Kilometers.</i>
1	San Juan Plaza to Ponce Playa .....	135	135
2	Section A, Cataño to Vega Alta .....	27.5	23
2	Section B, Aguadilla to Camuy .....	42	26
2	Section C, Mayaguez to Añasco .....	9	9
3	Section A, Ponce to Guayama .....	56	0
3	Section B, Mayaguez to Yauco .....	46	20
4	Cayey to Arroyo .....	33	33
5	Caguas to Humacao Playa .....	39	39
6	Ponce (west end of Calle de la Villa) to Arecibo .....	81	75
7	Rio Piedras to Humacao Playa, section A .....	78	43
7	Section B, Arroyo to Humacao .....	47	9
8	Aguadilla to Lares .....	37.5	23
9	Bayamon to Comerio .....	27.5	5
10	Reyes Catolicos Bridge to Corozal .....	13	13
11	Manati to Ciales .....	13	13
14	Mayaguez to Las Marias .....	23	9
	Total .....	707.5	475

This list represents at present the roads which, by your direction, are and will be taken charge of by this bureau. They may, therefore, be properly and officially designated as insular roads.

Adding to the 475 kilometers of finished roads the unfinished portions of roads which have been put in charge of the bureau of public works, and which are now being put into first-class order with allotments from the trust fund, and are being cared for by a partially organized force paid from the trust fund and the regular budget, the total number of kilometers now being maintained is, as stated above, 603.5. The unfinished sections referred to are: From the Reyes Catolicos Bridge to Vega Alta, 4.5 kilometers; between Aguadilla and Camuy, 16 kilometers; between Ponce and Guayama, 56 kilometers; between San German and Yauco, 26 kilometers; and between Mameyes and Naguabo Playa, 26 kilometers.

This total is an increase of 42 per cent over that of the past year. It is probable, however, that before the expiration of the present fiscal year, 1903-4, the rest or nearly all of the 707.5 kilometers of roads now designated as insular roads will have been placed in our hands to maintain. There is, therefore, a prospective increase of nearly 59 per cent which has to be provided for. This brings up the question of available means for that purpose, and the manner in which the maintenance is now being done and should be done.

The budget for the past fiscal year carried appropriations for the maintenance and repair of roads, and for the payment of salaries of the field force amounting to a total of \$238,700. Of this total \$1,200 were for rent of tool sheds and caminero houses; \$10,000 for repairs of bridges and culverts; \$10,000 for the purchase of road machinery and tools; \$72,000 for road material and incidental expenses connected therewith; and \$145,500 for payment of wages of the supervising and laboring force. Assuming that all this money was expended, the average cost that can be broadly charged for maintaining 1 kilometer of road during the past year was \$537, of which 61 per cent was for labor and 39 per cent for material and incidental expenses. Notwithstanding that this is a reduction per kilometer of \$88 upon that of the previous year, which was \$625, it is apparent that these expenses are still unusually large. Since 1899, when the expenses per kilometer for maintenance were about \$1,000, the

annual amounts expended for that purpose have gradually decreased, in the face of the large additions made in the total mileage to be maintained, consisting mainly of new roads requiring unusual care and watchfulness. There will soon be a limit, however, in this favorable decrease of expenses after the roadbed of the older roads, which have been neglected for years, has been restored to a proper thickness and the finishing of incompletely constructed portions of new and old roads given in charge of the bureau has been accomplished. If in the course of time nothing remains to be done but the employment of the necessary help and a comparatively small annual outlay for material for repairing, the cost of maintenance will still be, if the present system is retained, a heavy burden on the treasury of this island.

The system of road maintenance prevailing on this island is copied from those in vogue with the larger and most cultivated nations of Europe. It is a most excellent system when thousands of miles of roads are to be taken care of under the eyes of a paternal government which from the beginning looked upon the necessity for constructing and maintaining good roads solely from a military and strategic point of view; expenses for that purpose, no matter how large, were of little consideration. But it is a too elaborate and expensive system for a small island like Porto Rico, which must hereafter derive its revenues from taxes imposed and collected by the will of the people, happily without any coercive military enforcements and requirements, and which, under the present state of affairs and for some time to come, can little afford to continue and bear such a heavy expenditure.

I have at various times in the annual reports and through special communications had occasion to call attention to the excessive cost of maintaining the roads. A change seemed to me to be imperative, and suggestions with that object in view were made. I have collected numerous data from standard works, consular reports, and other publications, from which at a glance an idea can be formed how the expenditures made for that purpose in Porto Rico compare with those of other countries, and include the most valuable in the following table:

TABLE NO. 2.—*Comparative cost of maintaining 1 kilometer of macadam road per annum.*

Porto Rico:	
1899 .....	\$1,000. 00
1900 .....	642. 00
1901 .....	625. 00
1902 .....	537. 00
France:	
National roads .....	160. 00
Departmental roads .....	120. 00
Country roads .....	\$40. 00 to 80. 00
Spain .....	150. 00
Italy .....	127. 00
Switzerland .....	\$75. 00 to 500. 00
England .....	\$147. 00 to 155. 00
Scotland .....	\$55. 00 to 269. 00
Ireland .....	\$63. 00 to 198. 00
Austria .....	142. 00
Lower Austria .....	\$242. 00 to 304. 00
Denmark .....	78. 00
Germany:	
Hanover .....	127. 00
Prussia .....	172. 00
Bavaria .....	130. 00
Baden .....	129. 00
Saxony—	
State roads .....	162. 00
Country roads .....	100. 00
Island of Antigua .....	62. 00
Jamaica .....	102. 00
Guadeloupe .....	200. 00
Colombo, Ceylon .....	\$37. 00 to 251. 00
Damascus, Syria .....	178. 00
Australia, New South Wales .....	52. 00

In explanation of the high cost in Porto Rico, it should be said that a great portion of our work done under the title of maintenance is really new construction; required in completing unfinished and neglected sections of roads and in rebuilding broken bridges and culverts and other auxiliary works which were destroyed by the cyclone

of 1899. If this class of work is not taken into consideration, the average expended on maintenance proper will be considerably less than is given above. With the utmost care and the best organization it may be possible in the course of time, if the present system is continued, to reduce the average cost to that prevailing in France, Germany, and Switzerland, where the system of maintenance up to date has obtained its greatest perfection. From an extensive series of observations made during many years at Hanover, Germany, the integral parts entering into the expense for maintaining finished macadam roads, and their relative proportion to the whole, are the following:

	Per cent.
Purchase and delivery of material .....	41
Wages for labor and supervision.....	46.2
Repairs of bridges and culverts.....	2.5
Preservation of caminero houses.....	.7
Fences and milestones .....	.4
Planting of trees .....	1.3
Purchase of tools.....	2
Indemnification for quarries and lost tools .....	.5
Ferries and generally .....	5.4

This compilation is very instructive, and it may be fairly assumed that under similar conditions the relation of the different parts to each other would hold good in any other country. The advantage the Porto Rican roads have in not being subjected to the destructive effects of the annual freezing like the European roads, is more than lost again by the damage done by the torrential rains during the rainy season. While the percentage expended on labor in Europe is about 47, that in Porto Rico is 61 of the whole cost. This excess is partly due to climatic conditions and to a too elaborate organization. The latter may be reduced, though our district engineers do not advise such a course.

Accepting a constructive similarity between the roads of Porto Rico and those of Switzerland and Lower Austria, and also a meteorological resemblance in the conditions affecting the road surface through heat and rain when compared with those of Ceylon, even if it should be possible to bring down our average to that of these roads, say \$300 per kilometer, the annual expense for maintenance to be paid by the island, when the 707 kilometers of roads are entirely finished, will be \$212,100. This is equivalent to a per capita tax of 21 cents on every man, woman, and child on the island, and it will be difficult to make it any less under the present system.

I have been convinced for some time that the maintenance of the insular roads can be much more economically accomplished by having the part of it relating to labor alone, or probably the whole work, done by contract. The contract system has been tried on a large scale in Austria and Belgium for many years, and recently with great success on the island of Antigua and in the State of Massachusetts. It is a system which for a long time existed and still exists in the counties of many of the States of the Union, particularly in the Southern States, where it is more or less affiliated with convict labor. About the only reliable data which I have been able to obtain relative to the average cost of maintenance by contract per annum and per kilometer are: Belgium, \$13; Antigua, \$18 to \$36; and Massachusetts, average, \$35. In each of these cases the Government or State furnishes the material necessary for the repairs; the above prices are, therefore, those paid for labor only.

As the average pay a laborer receives in Massachusetts is \$1.25 and in Porto Rico 50 cents per day, and as the expense for teams is in about the same ratio, it may be assumed that the same work required in maintaining a road can be done for 60 per cent less in Porto Rico than in the former State. In Massachusetts a laborer can work on the roads probably only seven months in the year, whereas in our latitude he must keep at it for twelve months if he wishes to prevent the grass in the ditches from growing over his head; the same work is therefore worth more here, and, taking into account the increase in time and difference in wages, is, upon that basis, \$36 per kilometer. If the necessary expenses for inspection and supervision are added it may be \$41 per kilometer.

If this represents, as per standard distribution given previously, 46.2 per cent of the whole expense, the average cost of maintaining 1 kilometer one year by contract should not exceed \$90, made up as follows:

Purchase and placing of 15 cubic meters of broken stone, 41 per cent.....	\$36.90
Wages for labor and supervision, 46.2 per cent .....	41.58
Repairs of bridges and culverts and other incidentals, 12.8 per cent .....	11.52
Total .....	90.00

This figure is given merely as an illustration of what the expenses would be if the roads were in such a condition that no extensive reconstruction would be required; that the labor would be done by contract, based upon prices and requirements as now in use in the State of Massachusetts; that the cost of broken stone in place is about that paid last year, \$2.78 per cubic meter, and that of the latter no more than about 15 cubic meters per kilometer would be required. It represents, in other words, a sort of ideal future condition, which it may take years to reach, but which, nevertheless, I am sure will come. I reiterate, therefore, my recommendation made in previous reports, that the contract system be tried first, as an introductory measure, on one of the older roads, preferably that between San Juan and Ponce.

Continuing the review of the reports of the road supervisors, it will be noticed that during the past year the total number of cubic meters of stone placed on different roads was 27,803, of which 18,878 cubic meters were used in the San Juan district and 7,325 and 1,600 in the Ponce and Mayaguez districts, respectively. The prices paid per cubic meter for the stone were: San Juan district, minimum, \$1.40, maximum, \$2.75, average, \$1.87; Ponce district, minimum, 60 cents, maximum, \$2.40, average, \$1.56; Mayaguez district, minimum, \$1.53, maximum, \$2.25, average, \$1.62, making the average price for the whole island, \$1.77. The average expenses for placing the stone, including hauling, screening, and rolling, were: San Juan district, 87.6 cents; Ponce district, \$1.04, and Mayaguez district, 75 cents, or an average for all of 91.2 cents per cubic meter.

The total cost per cubic meter in place was calculated in 1902 at \$2.25. This year it was \$2.68, the increase being principally due to the cost of the better quality of stone now being used near San Juan and to the fact that most of the stone was placed in patches and only a comparatively small quantity in continuous sections. The price is also undoubtedly affected by the quantity purchased, whether large or small. When furnished in large lots a contractor can afford to do so at a less rate within a specified time than he can if called upon to deliver small quantities at various times and at points situated some distance apart. It was found much more convenient, however, to buy the stone in small quantities at the right time, and to have it delivered where and when wanted, avoiding thus unnecessary piling up and obstruction of the roads before it could be used. The employment of extra inspectors could also be dispensed with, nor did we have any of the disagreeable experiences with failing and delinquent contractors as during the previous year. I am inclined to believe, however, and repeat what I stated in the last annual report, that if the furnishing of all the broken stone needed during the fiscal year on the insular roads was let in one contract much lower prices would probably be obtained. To make such a plan feasible nothing but the drawing up and enforcement of a rigid set of specifications would be required; the contractor would do the rest.

Anyone with an observant mind must have noticed the great improvement in the road surfaces of the roads that have been repaired with steam road rollers. The difference is noticeable in passing from one section to another in a carriage. The sections consolidated with the old-fashioned light ox roller have a hollow, spongy sound, the sharp corners of the broken stone protruding to a disagreeable degree. The section consolidated with the steam road roller has a sharp, metallic ring, over which the antiquated vehicles pass with a comfort and ease heretofore unknown. It is a fact worth noting as a curiosity that two fatal accidents have occurred on two different roads which had been put in first-class condition, by teams, during the night, going over the edge of the road, because the drivers had gone asleep. Such a thing was impossible formerly, when the men were kept constantly awake looking out for rocks and mud holes. But the effects of the rapid extension of good roads are not shown by such small happenings alone. There is a decided change taking place for the better in the harnessing of the draft animals and in the type of vehicles, carriages, and wagons which are being used. The lighter, cleaner, and more scientific constructions are coming to the front, American in style, with a tinge of the department-store look about them, but, nevertheless, indicating an inclination to follow the tide of irresistible modernization. The economic value in other directions of the improved roads is, however, of much greater extent and influence. Aside from the advantage in facilitating intercommunication, the principal gain lies in the reduction of the cost of transportation on goods and products hauled to and from the interior. From present indications this reduction is between 50 and 70 per cent of the former cost. As soon as the so-called trunk lines of new roads are opened for through traffic this bureau proposes to instigate an extensive series of periodical observations and a thorough investigation of, and in relation to, the past and present amount of traffic, transportation, and physical and economical changes produced by the advent of good roads.

Two new steam road rollers were purchased during the early part of the year and another one a few months ago, making a total of six now owned by the bureau. In





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addition, two others belonging to private parties have been chartered by the month. Of the eight thus employed, five have been continuously working on the San Juan-Ponce road, one of these having been detailed for several months to the Ponce-Adjuntas road; the sixth has been steadily engaged in recovering the sections of unfinished road between Arecibo and Utuado; the seventh has been since March on the Aguadilla-San Sebastian road, doing repair work, and the eighth has been for nearly a year employed in repairing the roads around Mayaguez, and especially on the reconstruction of the Cabo Rojo road. There still is and will be a great necessity of substituting the ox road rollers by steam road rollers on other sections of the insular roads, but the lack of bridges on some of them prevents this. Most of the rivers or creeks that have to be forded are too deep or their banks are too precipitous to permit of such a heavy machine to pass across safely. Within these inaccessible sections the ox roller is, therefore, still in use, and those that are being used have a greater average weight than formerly, because after the introduction of steam road rollers the antiquated cast-iron drums, originally used for crushing sugar cane and afterwards as road rollers, have been discarded and replaced by the large horse rollers imported from the United States.

## 2. CONSTRUCTION OF NEW ROADS AND RECONSTRUCTION OF OLD ROADS.

### A. NEW CONSTRUCTION.

(a) *Defendini section of the Arecibo-Ponce road.*—Work on this section, which is 5.93 kilometers long, was in progress at the beginning of the fiscal year under a contract with Roque Paniagua, dated January 4, 1902. The amount allotted for this work from the "Trust fund" and expended was \$90,000, of which \$79,414.13 was paid to the contractor. The principal work was finished on January 1, 1903, but the finishing touches not until February 1, on which date the road was provisionally accepted. The final liquidation took place June 1, 1903.

(b) *Rio Chico section of the Arecibo-Ponce road.*—This section is 5.22 kilometers long, and is situated upon the northern slope of the mountain range called "the Tallones." Its construction was begun under a contract with Marix & Co., dated February 28, 1902, and was not completed until April of this year. The original allotment from the "Trust fund" for this section was \$74,000, which was subsequently increased to \$79,000. On account of a refusal of the contractors to accept the final estimate of our engineer of the total excavation done under the contract, no final settlement has been had, but the road is being maintained by them for six months, as required, since April 1.

(c) *Yabucoa-Maunabo road.*—Work on this section has been in progress since May of last year under a contract with Demetrio Garofalo, dated April 20, 1902. It was to be completed January, 1903. The contractor experienced many difficulties in carrying out his work, partly by strikes among the laborers, but principally through the peculiar configuration of the ground over which the road is being built. The mountain range called "La Pandura," over which the road leads, is a mass of immense loose granite boulders, the crevices between being filled with light vegetable soil. Disturbing them is immediately followed by extensive land slides or by the formation of deep hollow spaces between the blocks, which have to be filled up to obtain a foundation for a roadbed. The length of road under contract is 9.36 kilometers. The allotment made from the "Trust fund" for its construction was \$38,000. Several extensions of time for the completion of the contract had been given the contractor, and the work dragged along until about all the grading and portions of the macadam had been done, when, in preparing for another extension, which was to be the final one, the bondsmen of the contractor refused to continue their surety. As the contractor had done more work than the original amounts called for in the contract, it was decided to close the same on June 26, 1903, at the expiration of the last extension, and to finish the road with the available balance by day labor under the direction of our local engineer.

This work is now in progress and will soon be completed. The final liquidation with the contractor has, however, not yet been made.

(d) *San Sebastian-Lares road.*—A contract had been made with Marix & Co., on May 6, 1902, for the construction and completion of this road between the towns named, a total distance of 14.67 kilometers. The allotment from the "Trust fund" for this work was \$75,000; the bid was \$78,315.68. As the bureau compelled the contractor, however, to use the 11,554 cubic meters of broken stone stored along the road two years ago by order of the military governor, for which they were to pay \$1 per cubic meter, their aggregate bid was reduced by that much, making the total only \$66,761.68. The whole length of the road having been originally subdivided into two sections, one 6 and the other 8.6 kilometers long, to give contractors of small

means an opportunity to bid for one part only, proposals were received for each section separately.

As the prices bid by the lowest bidder, Marix & Co., were for all items in both sections the same, the quantities in both were added together and so entered in the form of agreement. Their classified bids for excavation were averaged, however, upon the basis of the engineer's estimate. The agreement was afterwards signed, sealed, and approved by all parties concerned.

Actual operations commenced in July, 1902, and continued at a fair rate of progress for two months, payments being made as agreed upon in the contract. It developed, however, while the excavations were being made, that the classification of material as originally made by our local engineer was far from being correct, and that nearly all of it proved to be either solid rock or of such a character that the use of explosives was almost continually required. The contractors thereupon declined to continue the work unless the price for rock was rearranged, claiming that the character of the material was misrepresented before they made their proposal and that the subsequent reduction of their classified proposal to an average price in the agreement which they signed was made against their wish and consent. This bureau held that whatever was stipulated in the signed agreement was binding to both parties, and to be quite clear upon this point submitted the whole question to the Acting Attorney-General. The latter, in a long opinion rendered October 10, 1902, decided that this view of the matter was not correct and that prices as made in the bid must stand.

Excavation was therefore continued under the special prices named in the original proposals, and some time in December last, when the total rock excavation had reached the amount stipulated in the contract plus 10 per cent, the contractors asked for an increase from 30 to 60 cents per cubic meter, which under existing stipulations they had a perfect right to do. An effort to have them reduce this price having failed, and in view of the state of the work and that the price offered was below the average price paid on other roads for rock excavation, a recommendation to accept their offer was approved, all payments made thereafter for rock excavation in the first section of the road where the original estimated amounts had been considerably exceeded, being made upon this basis.

Some time during the latter part of February an almost identical question arose relative to the legality between prices made in a proposal and those fixed upon in a contract in the case of the contractor building the Yabucoa-Maunabo road, who had for eight months accepted an average price for excavation and who now claimed payment for rock excavation in accordance with his original bid, which was much higher than the average price. This claim, with the necessary documents and letters explaining the same, was submitted to the attorney-general, and his special attention was called to the opinion rendered by his assistant, the acting attorney-general, the previous year on the same question in the case of Marix & Co. His decision was awaited with a great deal of interest, and was given on March 5, last. It was in substance a reversal of the opinion rendered by his assistant, asserting that a contractor is bound by the terms of the signed contract and not by his bid. Unfortunately, the attorney-general gave this bureau no advice how far his decision affected the contract then in force with Marix & Co., and at the conclusion of his opinion merely stated that "the expressions contained in the letter of the acting attorney-general, dated October 10, 1902, in so far as they might be controlling in this (the last) case, are hereby overruled." Upon further request, addressed to the attorney-general after receipt of this opinion, to state whether the latter affected in any way the contract in force with Marix & Co., because it embodied the same features and conditions, a negative answer was received. Nevertheless, Marix & Co. were informed of the decision rendered and of the deductions made therefrom in this office, that the price paid for solid rock excavation up to the original amounts estimated and 10 per cent added should not exceed the average price stipulated in the contract.

There followed much correspondence between this bureau and the contractors, pro and con, and with your approval it was finally decided to settle the whole question upon a basis of justice and equity, embracing the following principal points: (1) To consider the work as being done under two contracts; (2) to classify the material being excavated, on account of the excessive increase in the amount of rock over that originally estimated; (3) to pay only the average price agreed upon in the contract for all excavation up to the 10 per cent limit, as specified and classified therein.

The contractors were advised of this proposition, and after some hesitation accepted it on May 4 last. All payments that had heretofore been made, and those that had been withheld since January, were adjusted upon the new basis and paid. When auditing the vouchers, the auditor of Porto Rico objected to the payment having been made in this manner, claiming, what this bureau did at first, that the contract must stand as it is, as covering both sections in one, and the average price to prevail until the total excavation plus 10 per cent has been reached. He dis-

allowed the difference between payments made up to April 1, and what, according to his opinion, should have been paid, a total of \$11,152.11. Against this decision the contractors appealed to the acting governor, who resubmitted the whole question to the successor of the attorney-general who had given or not given his opinion on March 16 last. This bureau has lately been informed that the last opinion of the attorney-general confirms the stand taken by the auditor, and that the contract as signed is legal.

The contractors have refused to continue the work under these conditions, and it has been decided to close the contract at the expiration of their time, August 1, 1903, and to do the rest of the work, or as much as the available balance will permit, by day labor. About 10 kilometers of the road are finished, except a short section of about 2 kilometers in length where the macadam was not placed on account of the present unstable condition of the high adjoining side slopes, which consist principally of loose and rotten rock.

(e) *Bayamon-Comerio road*.—At the beginning of the fiscal year a project for the expenditure of an allotment of \$120,000 made from the "trust fund" was being prepared. The original plan to construct 12 kilometers of new road connecting with the 5 kilometers already finished near Comerio was abandoned and, instead, the Bayamon end selected, the length of road estimated to be built with the available funds being 14.5 kilometers. The project, which is for a second-class road with 4.50 meters macadam, was approved, and after inviting proposals the following bids were received:

TABLE No. 3.—*List of bids for the construction of 14.5 kilometers of road No. 9 between Bayamon and Comerio, opened December 17, 1902.*

Andres G. Canton, Naranjito.....	\$104,450
Roque Paniagua, San Juan.....	110,780
Jose Gonzales Padin, San Juan.....	112,585
Giles & Marix, San Juan.....	127,975
Mullenhoff & Korber, San Juan "	99,490

The work was commenced last January and is to be completed in one year. On account of the unusually prolonged dry season the contractors have been able to make good progress, and by taking advantage of this and employing large forces of men under an intelligent and prudent manager, have succeeded in finishing at the end of the fiscal year nearly all the grading, the largest part of the masonry works, and had actually begun to place macadam upon several sections of the new road.

(f) *Las Marias road*.—An allotment of \$30,000 made from the "Trust fund" last March is available for the construction of about 3 kilometers of new road near Las Marias to complete the road between that town and Mayaguez.

A survey of this section has been ordered, and as soon as the project is made and approved the work will be advertised and commenced.

(g) *Tallones-Adjuntas section of the Arecibo-Ponce road*.—On April 29 last the governor authorized an allotment of \$85,000 from the "Trust fund" for the completion of the Arecibo-Ponce road. This amount was to be especially used to complete the last unfinished section of this road situated north of Adjuntas 9 kilometers long, and to continue work south of Utuado in macadamizing another unfinished section 7 kilometers long. It was estimated that for the first section about \$70,000 would be required, leaving the rest for stone at other points. In the section north of Adjuntas were over 32 unfinished culverts, and some grading had been done; at many disconnected stretches macadam had been placed. It was necessary to make a thorough detailed survey of the whole 9 kilometers to determine closely the amount of work to be done. After everything had been prepared it was decided to do the work by contract, and after due advertising the following bids were received:

TABLE No. 4.—*Bids received for the construction of a section of the Arecibo-Ponce road, 4.6 kilometers long, between Tallones and Adjuntas, opened July 16, 1903.*

Jose Roig Colomer, Utuado.....	\$60,626
Raoul Marix, Utuado.....	47,577
Domingo Rinatti, Ponce.....	69,370
Luis F. Rubio, San Juan.....	65,629
Roque Paniagua, San Juan.....	71,307
W. D. Noble, San Juan.....	71,518

The contract was awarded to Raoul Marix and is to be completed in five months. Work is now in progress.

## B. RECONSTRUCTION OF OLD ROADS.

(a) *Yauco-Sabana Grande road*.—A project for the improvement of this road had been approved in March, 1902, and with the allotment of \$61,782 from the "Trust fund" preparations had been made for the construction of new masonry culverts by contract and the repairing of the road by day labor. The work comprising the culverts was let to Marix & Co., at \$10,568.50, before the fiscal year had commenced, and was to be completed by October 16; but actual operations did not begin until September, for lack of cement. Very slow progress was made afterwards, necessitating three extensions of time for completing, which was at last accomplished in May, 1903, after several additional culverts not on the original plan had been built. The total amount expended under this contract, including extra work, was \$13,601.04.

After the completion of several of the principal culverts, work on the roadbed was begun in December, 1902, first with a small force of men, later, when all were finished, with two sections of men, one near Sabana Grande, the other near Yauco, employing in each on an average 200 men and many carts. The work was being done by the bureau under the supervision of an engineer and two experienced sobrestantes. One particular section, 1.3 kilometers long, near the "Rio Loco," requiring a deep cut, was let to be entirely completed by contract to Duffaut & Gonzalez, of Mayaguez, who were the only bidders, their prices being 34 cents per cubic meter, for a total of about 14,000; 6 cents per linear meter for ditches; \$1.55 per cubic meter for broken stone, and 35 cents for each cubic meter of screenings. This work is still in progress and is to be completed August 28, 1903. At the same time a contract was made with the same firm for the delivery of about 5,800 cubic meters of broken stone at various points along the road, at the rate of 2,652 cubic meters at \$1.30 and 3,148 cubic meters at \$1.50 per cubic meter. No other bid had been received. The total quantity to be furnished under this contract was subsequently reduced to 3,912 cubic meters, and its delivery completed at the end of the fiscal year.

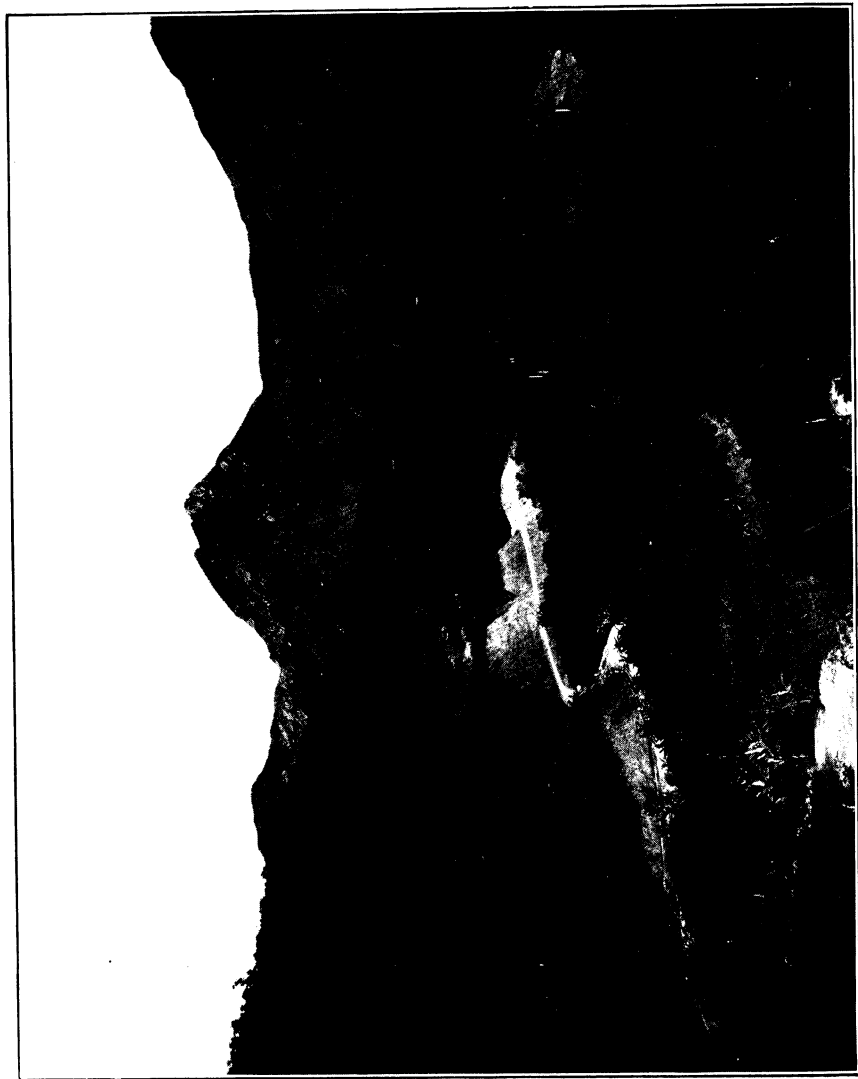
Of the total distance between Yauco and Sabana Grande of 16.5 kilometers, 10 had been finished in July, 1903, and nearly 2 more will be finished in August. The work was done on the roughest and most impassable sections. The 4 kilometers to be finished are in fair condition, but will be brought to the same state as the others before the work closes.

(b) *Mameyes-Fajardo-Naguabo Playa road*.—At the beginning of the fiscal year work was in progress between Fajardo and Naguabo Playa under an allotment of \$10,000 from the "Trust fund." The allotment was expended by the following August, and consisted principally in filling up mudholes, removing projecting boulders and rock, and in cleaning ditches, distributed over an aggregate length of 4½ kilometers, which improved the road somewhat, but it was far from what it should be.

In December last another allotment was made from the Trust fund, amounting to \$25,000, for the Fajardo road—that is, from the end of the finished section of the Rio Piedras-Fajardo road at Mameyes over the unfinished section to Fajardo, which it had previously been estimated would cost \$58,000 to put in first-class condition. Part of the allotment was also to be applied for repairs urgently needed on the road between Fajardo and Naguabo Playa. Work was begun in December, 1902, and continued under five different parties, each in charge of an experienced sobrestante, until the end of the fiscal year, when the funds were exhausted. The results accomplished speak well for those in charge of the work and show that the repairs were made with a great deal of sound judgment and economy. Between Mameyes and Fajardo 7.5 kilometers were repaired, comprising reduction in grades where necessary, new fills, the widening and cutting of side ditches, and the placing of macadam or gravel for a width of 4 meters upon the roadbed, besides the rebuilding of old and new culverts, which was equivalent to building a new road. Between Fajardo and Naguabo Playa the same class of work was done over a total length of 5.5 kilometers.

The work had been concentrated, as is usual in doing repair work with limited means, in alleviating the conditions at most impassable sections of the road. Besides the above complete reconstruction of the road carried on in continuous sections of variable length, the intermediary points which needed improvement were patched and ditched and sometimes graded, the actual ground thus covered amounting in the Mameyes-Fajardo section to 5.5 kilometers and in the Fajardo-Naguabo Playa section to 2 kilometers. With the exception of the sandy stretch about 2½ kilometers long, west of Luquillo, where the road follows the seashore, the whole road is now very much improved, though much remains to be done, and the saving in time and cost of transportation between the points named has been quite noticeable. The average number of men employed per day was 300. This road, 37 kilometers long, is now being taken care of by this bureau, having been put on the list as an insular road, the expenses for maintenance being paid from a transfer of \$1,000, authorized by the governor from the allotment for the repairs of the Camuy-Aguadilla road.





NEW ROAD BETWEEN UTUADO AND ADJUNTAS ("TALLONES").



(c) *Camuy-Aguadilla road*.—The repairs and reconstruction of this road, which is 42 kilometers long, were begun in 1901 and continued early in 1902 with allotments from the regular budget of \$2,000 and \$18,380, respectively, applied in making the most necessary repairs at such points as were in an almost impassable state. Under orders from the Department an examination of the whole road was made last October, to determine the cost of putting it in first-class order. An estimate for a 6-meter roadbed, covered with  $4\frac{1}{2}$  meters of macadam was subsequently submitted, including the regulation and lowering of grades over many rocky ridges and the construction of many new culverts, which amounted to \$79,656 for the whole distance of 42 kilometers. It was a reasonable estimate, considering the great length and condition of the road.

An allotment of \$30,000 was made in December from the "Trust fund" to continue repairs, and a large force of men was immediately set to work, divided into two parties, one starting in near Aguadilla, the other at Quebradillas. On June 30 work was suspended. The total number of working days each party was at work was 162; the average number of men employed in each, 170 per day. The first party finished in one continuous stretch between Aguadilla and Isabela 10.1 kilometers, at an average cost of \$1,300; the second party finished 6.48 kilometers between Quebradillas and Isabela, which section includes the rocky gorge on the west side of Rio Guajataca, and 3.36 kilometers in detached pieces between Quebradillas and Camuy, a total of 9.84 kilometers, at an average cost of \$1,250. The actual amount expended, including all engineering and contingent expenses, was \$25,365.93 at the end of the fiscal year. The two sobrestantes who were in charge of the field operations deserve much credit for the economical and discreet manner in which they carried out the instructions given from this office.

About 16 kilometers of the road, passing partly over rocky and partly over clayey ground, remain to be put in order. The road has been put on the list as an insular road, and is now being maintained, until other arrangements are made, with the available balance of the last allotment.

(d) *Ponce-Guayama road*.—This road which is 56 kilometers long and located in its entire length through the level and rich sugar-cane region of the south side of the island, was originally a municipal road, built without State aid by the municipalities of Ponce, Santa Isabel, Salinas, and Guyama. It was listed on the old Spanish plan of approved roads as No. 3, to be taken care of eventually by the State, but like many other municipal roads had been very much neglected during the past five years. It is a very wide road, attaining in some places a width of 10 meters, and had never any broken stone upon its surface, nor were there any ditches for proper drainage. Wherever any attempt at paving or filling mud holes had been made it was done with large block stone, which every passing team avoided afterwards as much as possible. The communities interested and adjoining this road had during the past four years at various times petitioned for its improvement by the government. In August last an examination was ordered, for the purpose of forming an approximate plan how the existing wretched conditions could be alleviated. The project which was afterwards submitted called principally for the raising of the roadbed, which was lower than the adjoining lands, for drainage and for macadam, and for the construction of many culverts and the rebuilding of bridges. For the macadam, much gravel found in nearly every river crossed by the road was available, which would reduce the cost of the contemplated repairs considerably.

Reducing the macadam roadbed to  $4\frac{1}{2}$  meters, and having in view the lowest economical basis possible in doing everywhere only the most urgent repairs, the total cost of the necessary improvement was estimated at \$60,000 for 54 kilometers, a very low estimate considering the high prices prevailing in the vicinity for labor and cart hire. I shall mention here, parenthetically, that when the request for the improvement of the road by the Government was made, that here, as in similar cases on other roads, we had received promises from the adjoining planters to furnish teams for hauling free of charge when actual operations should begin. I am compelled, however, to put on record the fact that in every case so far all these promises did not materialize, and that these public-spirited citizens (?) were just as eager, when the opportunity came, to charge as much for the use of their teams as any poor man. It is proposed, hereafter, when occasion arises, to request these promises individually or collectively in writing.

On December 4 last the governor made, upon your recommendation, an allotment of \$30,000 from the "Trust fund" for the construction of this road, the money to be applied principally at such points where the improvements were most urgent. Work was begun on the 15th of the same month at kilometer 4 from Ponce, and was successively extended toward Santa Isabel and Salinas. Another party started in at Guayama and worked toward Aguirre Central. The unusually dry season was very favorable for outdoor work and, in consequence, good progress was made and better

results accomplished. The allotment was nearly expended on July 31 last, the total number of working days having been 184, and work has since then been suspended. About  $7\frac{1}{2}$  kilometers of the road were finished between Ponce and Santa Isabel;  $2\frac{1}{2}$  kilometers between Santa Isabel and Salinas; nearly 2 kilometers between Salinas and Aguirre Central; and about  $1\frac{1}{2}$  kilometers between Guayama and the last-named point. Between these sections much repairing work was done to make the road passable and many decayed culverts and bridges were reconstructed. Much remains to be done, and another allotment of funds is necessary to put the whole road into proper condition.

(e) *Naguabo-Naguabo Playa road*.—Encouraged by the extensive improvements in progress at the time upon the Fajardo road, the people of Naguabo, who were also interested in these improvements, inasmuch as Naguabo Playa on the southern end of the Fajardo road is their only outlet by water, applied to the governor in December last requesting that the work then going on at the playa be extended to their town, a distance of only  $3\frac{1}{2}$  kilometers, over the old municipal road, which was in a very bad condition. Their request was coupled with a very fair representation of the great benefit that would be derived from the improvement of the road, not only by the people of the town, but by all the country back of it, which of late years had been thickly settled and developed by settlers who had introduced modern and more progressive ideas of cultivation.

Upon your recommendation an allotment of \$2,000 was made subsequently from the "Trust fund," and during the first three months of the present year this amount was expended in opening wide ditches along the road from the river "Santiago" eastwardly and in filling mudholes with stone, and in grading the roadbed, the total distance improved being nearly 2.6 kilometers. The money expended was, however, not sufficient for the complete reconstruction of the road, and upon further advice an additional allotment of \$2,000 was obtained in June. This enabled us to place 4 meters of macadam upon the road for a continuous distance of 3 kilometers; the remaining distance to the town had been previously repaired in patches and is in fair condition. A very steep grade on a part of the road near the Playa was reduced considerably, the roadbed consisting of solid rock, and new ditches cut. The work, which was in charge of a sobrestante, was well done and closed on July 15, both allotments having been expended.

About 1.45 kilometers of this road at the Playa end properly belong to the main road, No. 7, connecting the principal towns on the east side of the island—in this case Fajardo and Humacao—which has been placed upon the list as an insular road, and that portion is now being maintained by this bureau. The remaining distance, 2 kilometers, has been turned over to the care of the road supervisors of the Humacao road district.

(f) *Mayaguez-Cabo Rojo road*.—This is a municipal road branching off southward from the Mayaguez-San German road, at a point about 9 kilometers south of Mayaguez. It runs throughout its length over low but soggy land, and from neglect had, near the main road, become impassable, so that all traffic was forced to seek the adjoining fields. As it appeared desirable to afford the town of Cabo Rojo, which is an industrial center, some relief, an examination of the road was ordered in November last, to determine the probable cost of repairing it. The estimate of the engineer who made the examination was \$18,257 for the entire length of 6 kilometers. An allotment from the "Trust fund" of \$12,000 was authorized on March 21, 1903, and operations commenced in April, continuing until July, when the allotment was expended. As only a short section needed repairs to complete the whole road, authority was obtained for a transfer of \$500 from the Lajas road allotment to the Cabo Rojo road allotment, and the road was completed at the above date, the total expenditures amounting to \$12,500.

The road was immediately turned over for maintenance to the road supervisors of the Mayaguez district.

(g) *San German-Lajas road*.—This is a municipal road, and its condition and the needs for its improvement were similar to those as in the case of the Cabo Rojo road. The principal obstruction existing is a very steep, rocky grade near San German, the roadbed of which may have been once in a tolerably fair condition, but which in the course of time, through neglect, had been destroyed by running water to such a degree that even ox carts could not pass over it. It was principally for the purpose of improving this steep ascent that an allotment of \$5,000 was made on March 21 last, from the "trust fund." The party previously employed on the Cabo Rojo road was transferred to San German recently, and actual operations have been commenced.

(h) *Vega Alta road*.—The particular section under this name is part of the old Cataño-Mayaguez road, No. 2, and begins at the La Plata River, on the western end of the destroyed "Reyes Catolicos" bridge, and thence runs westerly toward Vega Alta, a distance of 8 kilometers. Four kilometers within the middle portion of this

section had been completed before 1898; the rest was passable, but very rough near the river, and soft and muddy near the town. The land on both sides of the road upon the higher ground near the La Plata has been recently parceled off into smaller tracts of land prepared for orange culture. To afford a better outlet for the settlers an allotment of \$5,000 from the "Trust fund" was authorized on June 2, 1903, to be expended particularly in regulating the unfavorable conditions of the road where it passes over a rocky promontory called "Espinoza." Work was begun last month and is now in progress.

(i) *Caguas-San Lorenzo road*.—This road, 9 kilometers in length, was originally to be a section of the projected road between Caguas and Humacao, which, before it was finished, was subsequently changed by the military governor to another route via Gurabo and Juncos. About 3 kilometers had been completed before the year 1898, including many brick culverts and a macadam roadbed; the two ends near the towns named had been left half-finished. By direction of the governor the reconstruction of the whole road was resumed in 1900 and continued in 1901, with an allotment of \$5,405.68 from the budget and an allotment of \$2,500 from the "Trust fund," and with a small budget balance of \$512.32 available for such work toward the end of the fiscal year 1901-2, a total of \$8,418. With these funds much repair work was done near the San Lorenzo end, so that carts did not find much difficulty in passing over the road. Much remained, however, to be done, including a change in the line at several river crossings near San Lorenzo.

An additional allotment of \$15,000 from the "Trust fund" was authorized on March 21 of this year to continue repairs, and it is believed that this sum will be sufficient to place the remainder of the road in a fair condition for all local requirements. Preparations are under way to begin the work this month, and as it is a municipal road it will, when finished, be turned over to the road supervisors of the Guayama district for maintenance.

(k) *Morovis branch of the Manati-Ciales road*.—The construction of this branch, which is 12 kilometers long, as a country road had been begun under the military government, but was suspended for some time after the civil government came into power, as its importance was considered only secondary to that of other main roads. Under the original contract closed in 1901, under which \$25,000, a budget appropriation, had been expended, nearly all the grading had been done, concrete culverts and abutments for a large bridge across Morovis River had been constructed, and some macadam had been prepared. Under orders from the Department, during the fiscal year of 1901-2, a gang of men was kept employed in breaking and placing stone upon the roadbed, beginning at the Manati end, and nearly 6 kilometers of the road were thus completed at an expense of \$9,000, paid from the appropriation for maintenance and repairs of roads. During the past fiscal year this work was continued in the same manner with less means and a smaller force of men, and 2 kilometers were added to the finished length at an expense of \$1,734.

It is proposed to continue the work hereafter in adding to the macadamed sections such lengths as the available means will permit, unless a special allotment is made to finish all at once. At present the finished section is being taken care of by the maintenance force of the bureau; after the whole road is finished it will be turned over to the road supervisors as a municipal road.

(l) *Arecibo-Ponce road, section south of Utuado*.—This is a section 7.3 kilometers long of one of the principal roads of the island turned over to the bureau in 1901 in an unfinished state by the military department. Immediately after its transfer a small gang of men was put to work opening ditches, removing land slides, and placing macadam. This work was continued during the past fiscal year so that now 4 kilometers of the total length are finished. The contract entered into the previous year with Jose Roig Colomer for the construction of new and partly commenced third-class masonry culverts and retaining walls, for which a transfer of sufficient funds from the labor appropriation had been authorized, was completed in February of this year, the total amount expended having been \$8,172.92.

As much work remains to be done, including some expensive rock grading at the southern end, an allotment from the "Trust fund" was asked for and obtained in April last to finish it, the necessary amount being merged in a general allotment of \$85,000, made for the completion of the Arecibo-Ponce road. The work is being done by day labor, and is in charge of one of the best sobrestantes in the district.

(m) *Arroyo-Patillas road*.—A special examination had been ordered and made in September, 1901, of this section, which forms part of road No. 7, encircling the whole eastern shore of the island from Rio Piedras to Arroyo, upon request of the property owners of the sugar-cane region through which it passes. It was estimated that it would cost \$9,123 to put the whole distance, 6 kilometers, in fair condition. An allotment of \$10,000 was made from the "Trust fund" on March 21 last to repair the road which was originally built by the adjoining municipalities, the accompany-

ing order directing that it should be kept in view that inasmuch as this road had been put upon the list of insular roads a more direct connection than at present exists with points beyond should be considered, and that the local requirements of the town of Patillas should not affect the project for a more direct course, if found advisable and practicable, further than to reserve a certain amount of the allotment for the purpose of repairing one of the two deviating roads leading up to Patillas on both sides of the Patillas River. Though there was some opposition apparent on the part of the people of Patillas when this proposed change was made known, the interests of the insular government and of the sugar planters in the valley prevailed, and a resurvey of the line having been made recently, it was found that to follow the old road, via Patillas, the distance between Arroyo and Maunabo would be increased by 3 kilometers, whereas by a cut-off made nearer the mouth of the river the distance would be correspondingly decreased.

The road supervisors of the Guayama district are in accord with the proposed change near Patillas which has received your approval, and the line is now being finally located, and as the parties interested have offered to obtain the right of way free of charge to the Government, the work of repairs and construction will begin as soon as the necessary condemnation proceedings have been complied with. The work is to include not only the repairs of the portions belonging properly to road No. 7, but also the branch road following the eastern bank of the Patillas River from its junction with the main road to the town.

(u) *Aibonito-Barranquitas road*.—Was originally only a trail, and is now considered as one of the municipal roads in the interior. Much repair work was done upon it after the war by an army officer stationed at Aibonito, who paid for the work partly in rations dealt out by the commissary department and partly in cash, \$7,000, furnished him from the insular budget. A survey made of the road in 1901 gave sufficient data to prepare an estimate for a third-class road with 3 meters of macadam. The length of the road is 11 kilometers. Near Aibonito a change in the line was proposed to avoid a heavy grade. With this change included, the total cost of reconstruction was estimated at \$35,000.

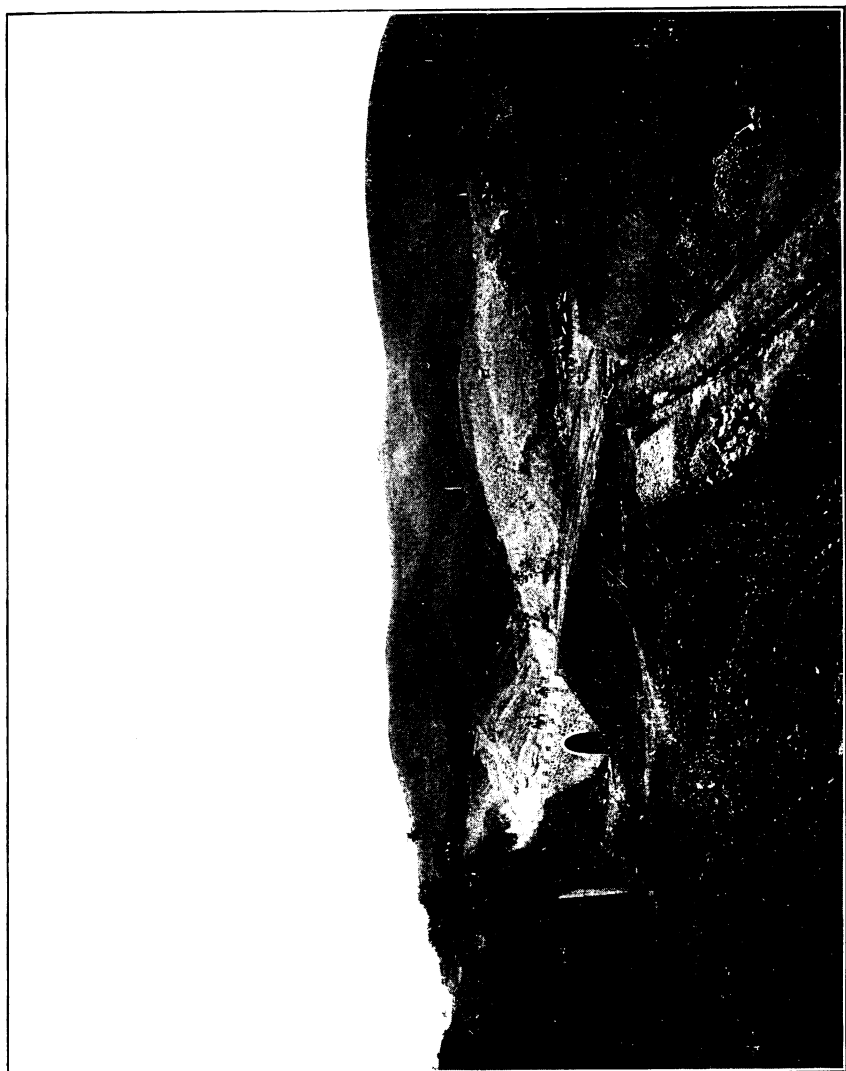
In March last an allotment of \$15,000 from the "Trust fund" was authorized for repairing the road as it is. Nothing had been done at the end of the fiscal year on account of much repair work being in progress in other parts of the island which has to be completed first. It is believed, however, that before the end of the present year the available funds will have been expended.

(o) *Mayaguez-Consunao road*.—This road is a section 15 kilometers in length of the Mayaguez-Las Marias road, and was originally built as a municipal road by the city of Mayaguez, under whose care and maintenance it has remained until recently. It connects at Consunao with a section of the same road 8 kilometers long which was built entirely new in 1901 by the military government, and which would eventually have been extended to Las Marias if the funds had not given out. These 8 kilometers are being maintained by this bureau.

In March last the Government decided to take charge of the whole road, and the governor authorized two special allotments from the "trust fund," one of \$15,000, for repairing the section heretofore in charge of the city of Mayaguez, and one of \$30,000 to construct anew the last 3 kilometers near Las Marias.

Many of the old culverts in the first-named section are ruined or broken, and preparations are now being made to repair them and to construct by contract other culverts needed. The repairs of the roadbed will be done by day labor. It is expected that before January, 1904, all these repairs will be completed.

(p) *Caniaco retaining wall, between Arceibo and Utuado*.—At the beginning of the fiscal year work was in progress under an agreement with Marix & Co., about one-half of the wall being in place. The construction of the wall had been made necessary after the original roadbed, constructed of loose rock, between a high rocky cliff and the river, had been carried away by a flood. The nature of the cliff is such as to have made it extremely risky and expensive to repeat the first trial by cutting a new shelf farther into it, and it was decided to place the roadbed upon a retaining wall reaching above flood level, making it secure for all time to come. The construction of the wall was necessarily expensive. It became more so after the debris of the old road was removed and the crumbling condition of the rocky points that had to be cut became apparent. It was also necessary to go much farther below the river level to obtain a fair footing for the foundation, which is of concrete. Although the work was being carried on during the rainy season, there was, fortunately, little interference with it by floods, and the wall was finally completed in November last, work on the new roadbed, and on a new culvert and side ditches having been carried on at the same time. The southern end of the wall was left in such a state that any extension on that end which may become necessary in the future can be readily made. The



NEW ROAD UNDER CONSTRUCTION BETWEEN BAYAMON AND COMERIO.



change made in the grade of the road to 1 meter below its former height required considerable adjustment, involving rock blasting in the adjoining roadbed north and south of the wall. The total length of road reconstructed is 317 meters, and the total amount expended, including three allotments aggregating \$28,262, made from the "Trust fund," was \$29,907.

(g) *Reconstructing culverts on the Caguas-Humacao road.*—One of the many new masonry culverts built under the military government in 1900 on this road had been destroyed last September during a heavy rain; others showed signs of weakness and cracks, and might be destroyed in a similar way at any time; the defect seemed to be in the construction of the foundations, which were not carried deep enough in the red-clay soil upon which they stood, nor was there any paving or proper aprons to prevent scour. A representation was made to the Department for urgent need of funds for reconstructing and repairing these culverts, which it was estimated would cost about \$7,000. Upon advice from the governor this amount was included in the deficiency bill passed by the legislature during its last session. Specifications were prepared from a careful examination made of each culvert, as it was intended to let the work by contract, and after due advertising the following bids were received:

TABLE No. 5.—*List of bids for the repairs of 34 culverts on the Caguas-Humacao road, opened May 19, 1903.*

Demetrio Garofalo, Yabucoa .....	\$8, 471. 50
José Lago, Bayamon.....	6, 381. 29
D. M. Palmieri, Adjuntas .....	6, 373. 55

The contract was awarded to D. M. Palmieri, who commenced operations in June, and who is required to complete it by September 5 next.

(3) SPECIAL ROAD DISTRICTS FIXED BY LAW, AND PROVIDING FOR THE BUILDING, MAINTAINING, AND REPAIRING OF COUNTRY ROADS.

In accordance with the law enacted by the legislative assembly of Porto Rico, on March 1, 1902, the island is divided in seven road districts, corresponding to the seven election districts, as follows: (1) Road district of San Juan, (2) road district of Areibo, (3) road district of Aguadilla, (4) road district of Mayaguez, (5) road district of Ponce, (6) road district of Guayama, (7) road district of Humacao.

A board of road supervisors, composed of three members for each district, is to exercise the powers of the body corporate created under the name of each road district.

In compliance with the provisions of the law, the first road supervisors for each district were elected on November 4, 1902, to serve two years under the jurisdiction of the commissioner of the interior.

Under the law the road supervisors are placed in charge of the municipal or vicinal and rural roads of their respective districts, to repair and improve them according to the available means at their disposal, and to turn them into permanent roads in the course of time, if possible, after the approval by the executive council of the general plan of such municipal or vicinal and rural roads prepared by the superintendent of public works with the advice of the board of road supervisors and cooperation of the district engineers.

This general plan is still in course of preparation, for the reason that the boards of road supervisors are not yet in good running organization and have failed to furnish the necessary data therefor. Some of the boards have not even yet reported their organization to the superintendent of public works.

However, in order to have some desirable and needed work accomplished as soon as possible by the road supervisors, the following recommendation was made by the superintendent of public works in an indorsement to the commissioner of the interior relating to the urgent repairs in some roads in the Mayaguez District: "That pending the formation of the 'general plan' the road supervisors be authorized to do emergency repairs against the funds available in the district treasuries on those municipal roads that were formerly repaired with the public funds of the municipalities, these roads having the necessary conditions to be comprised in the general plan of the vicinal and rural roads under which, after approval by the executive council, the road supervisors shall develop their work of repair and improvement."

On January 19, 1903, when it was presumed that all the boards had organized and elected their chairman, a circular was addressed to the chairman of each district requesting a list of the vicinal and rural roads that in the judgment of the respective boards should be comprised in the general plan. Up to date only the districts of

Ponce and Humacao have sent in their complete statements of vicinal and rural roads; the district of Guayama has only sent the statements of the roads pertaining to the municipality of Caguas. The others have not reported. In the meantime we have prepared in this bureau a map, on a large scale, of the island, showing as nearly as possible, with the available data at hand, the road districts, the municipalities, and the barrios, and a copy of the map of each road district has been sent to the respective boards of road supervisors to facilitate the collection of the data required for completing the general plan aforementioned.

The road districts as now established are shown on the accompanying map of the island.

#### (4) CONSTRUCTION OF ROADS WITH CONVICT LABOR.

In connection with this class of work, for which an appropriation of \$20,000 is available, I give the subjoined report of the assistant superintendent, dated July 1, 1903, who has special charge of it.

BUREAU OF PUBLIC WORKS OF PORTO RICO,  
*San Juan, P. R., July 1, 1903.*

MR. A. STIERLE,

*Superintendent of Public Works, San Juan, P. R.*

SIR: After the act passed by the last legislative assembly providing for the building of roads from Jayuya to the Ponce-Arecibo road, and from Humacao to Yabucoa, by convict labor, was communicated to the superintendent of public works on April 23, 1903, by the commissioner of the interior, the preparatory work was at once begun in this office. The director of prisons, on his side, had to prepare a set of regulations for the transportation of convicts to the camps and for their maintenance, discipline, and treatment thereat. These regulations were first examined in the bureau of public works, some changes proposed, submitted to the executive council for approval, and finally approved by that honorable body on May 14, 1903.

In the meantime the plans and specifications were prepared in this office for the buildings to be erected at the camps. As only \$1,000 were appropriated for the purpose, the utmost economy had to prevail in the projects. It is believed that by some involuntary mistake the sum of \$2,000 was appropriated for the buildings of the two camps, which amount for one alone is none too large. On the other hand, the appropriation for engineering and supervision, amounting to \$3,600, is obviously excessive, and a transfer from this appropriation to the other would be very desirable in order to allow at least larger dimensions for the buildings, and thereby more room for their future inmates.

The estimated cost of the buildings for one camp, consisting of one prisoners' shed 30 meters long by 6 meters wide, one police barracks 12 meters long by 6 meters wide, two rustic kitchens and privies, respectively, for the convicts and the police quarters, amounts to \$1,028.

All necessary plans, specifications, and documents for letting the work by contract have been prepared, and advertisement for bids, to be opened July 2, for the Humacao-Yabucoa road have been already published and also posted in the alcaldias of Humacao and Yabucoa.

A sobrestante has been appointed to take charge of the works, and directed to go to Humacao to select a good site for the camp on the property of Mr. A. Lopez, who has given permission to occupy the necessary land for the purpose.

A site having the required conditions for the camp has been selected by the overseer in charge, about 4 kilometers from the city of Humacao, and he is now in the office preparing the list for the purchase of tools and implements, and making everything ready to start work as soon as practicable.

All the preparatory work made for the Humacao-Yabucoa road is available, with slight changes, for the Adjuntas-Jayuya camp, which shall be started as soon as the Humacao-Yabucoa camp is in running order and the difficulties of the new work surmounted.

An engineer has been directed to go to Adjuntas and select a site having the requirements for the camp, near the "Alto de la Bandera," on road No. 6, section Adjuntas to Ponce, whereat the road to Jayuya is to be started.

His report is expected soon. The printed copy of the regulations approved by the executive council have not yet reached this office.

Respectfully,

P. F. FERNANDEZ,  
*Assistant Superintendent of Public Works.*



## (5) SURVEYS AND EXAMINATIONS FOR NEW ROADS AND BRIDGE SITES.

(a) *Survey between Barranquitas and Barros.*—Field work was finished in August, 1901. The length of the road surveyed is 11 kilometers. After the field data had been plotted and a project prepared, an estimate was submitted for a third-class cart road, 5.68 meters wide with 3 meters of macadam, at a total cost of \$99,321.

(b) *Survey between Barros and Jayuya.*—Actual field work was completed over this road, which is 52 kilometers long, during the latter part of 1901. The maps and studies were completed during the past fiscal year, and the estimated cost for the construction of a third-class cart road, 5.68 meters wide with 3 meters of macadam, is \$319,882.

(c) *Survey between Jayuya and Adjuntas.*—The preparation of the project for this road was in progress at the beginning of the fiscal year, the survey, covering 26 kilometers, having been made during the preceding year. The route selected follows generally the old trail along the ridge of the mountains and joins the Ponce-Adjuntas road about 6 kilometers south of the last-named town, at a point called "La Bandera." The estimate, which was made after all the data had been plotted and studied, is for a narrow cart road only 4 meters wide, covered with 3 meters of macadam, and places the cost at \$165,075.

The law promulgated last March for the construction of certain roads by convict labor specifically names this road as one to be built in that manner, and from the appropriation made for that purpose reserves the sum of \$10,000 to begin work. Nothing further has been done yet except the selection of a site for the convict camp.

(d) *Survey between Barros and Corozal.*—The studies and the preparation of a project for this road which had been surveyed the previous year were in progress at the beginning of the fiscal year and were finally completed last September. The estimate for a narrow cart road over the total distance of 27 kilometers is \$257,344, its construction on account of the rocky and exceedingly rough country over which it passes being a very difficult and expensive one. It is, nevertheless, an important road for the interior of the island, and its opening would be a great stimulus for the future development of these regions.

(e) *Survey between Bayamon and Comerio.*—The parties who were still in the field in July, 1902, completed their survey the following September. Certain parts of the road are now under construction, and for the 6 kilometers which are yet to be constructed the project and estimate can be prepared at any time when desired.

(f) *Survey of Arecibo-Ponce road near Adjuntas.*—The examination which was being made last year of the unfinished section of this road at the "Tallones" was extended southward after completion to embrace two other sections of the same road immediately north and south of Adjuntas, for the purpose of making studies for some changes in the present road which, if carried out, would save the expenses for the construction of three bridges. The present road crosses the river Cidra four times, or twice on each side of the town. Over one of these crossings an expensive concrete bridge has already been built. The road could be entirely relocated along the east side of Cidra River for a distance of  $3\frac{1}{2}$  kilometers, requiring only the construction of a few culverts, at an estimated cost of \$17,000 less than the cost of three expensive bridges if the original route is permanently adopted.

(g) *Survey of agricultural experiment station at Mayaguez.*—A survey of this tract of land, formerly called "La Carmen," located near Mayaguez, and containing about 235 acres, was made last June by this bureau upon request from the attorney-general's office. The land had been purchased conjointly by the insular government and the city of Mayaguez for the above purpose, and an accurate survey and map was called for to file with the necessary documents. The expenses, amounting to \$250, were paid from survey fund.

(h) *Survey of Los Baldios near Uruao.*—Upon request by the treasurer of Porto Rico, this tract of public land, comprising about 4,000 acres, is now being surveyed by this bureau. The parties have been in the field since June and the field work will be completed this month. The expenses are being paid from appropriation for "Miscellaneous expenditures, subject to approval by the governor."

(i) *Surveys for submergible bridges.*—On July 22 last an order was received directing that preparations be made for the construction of submergible bridges over the Añasco River, near Mayaguez, and over the rivers Inabón, Bucaná, and Portugues, near Ponce. Surveys of the proposed sites were made by the district engineers at Mayaguez and Ponce, respectively, with the assistance of the regular road force.

## (6) BRIDGES.

(a) *Manati River bridge*.—Two concrete abutments were built by the military engineers in 1900 for this bridge, which is located on the new Manati-Ciales road and has a span of 81 meters. The superstructure was purchased in France before the war, and was originally intended to be erected across the Loiza River at Carolina. It is a through bridge, built somewhat on the Whipple style, and lay for several years, dismantled, in the sand and mud near Carolina, until it was finally transported to Manati. The apparent motive for removing it from its original point of destination was probably the intention to erect another class of bridge at Carolina at a different site than the previous one, the old destroyed bridge having been very badly located. After the material for the bridge had been removed and cleaned it was discovered that some of the principal members, particularly the lower chord beams, which were in sections, were considerably affected by corrosion. Each piece was thoroughly examined and it was noted that corrosion had extended to many of the rivet holes. As a result it was decided that it would be too risky to erect the bridge in its present condition and that its life, if not its strength, would be materially prolonged by giving the span another central support and readjusting the system of vertical bracing to conform to the altered stresses. The latter operation could readily be done on the spot, as there were a sufficient number of braces on hand which needed merely reversal or riveting into new positions, requiring no additional material and no special tools.

Plans were prepared and approved for a third-class masonry pier upon a pile foundation, to be placed at the edge of the river and in the middle of the proposed span, the work to be done by contract. The work was advertised in November last and the following bids were received:

TABLE No. 6.—*Abstract of bids received for the construction of a masonry pier for the projected bridge across the Manati River, opened November 20, 1902.*

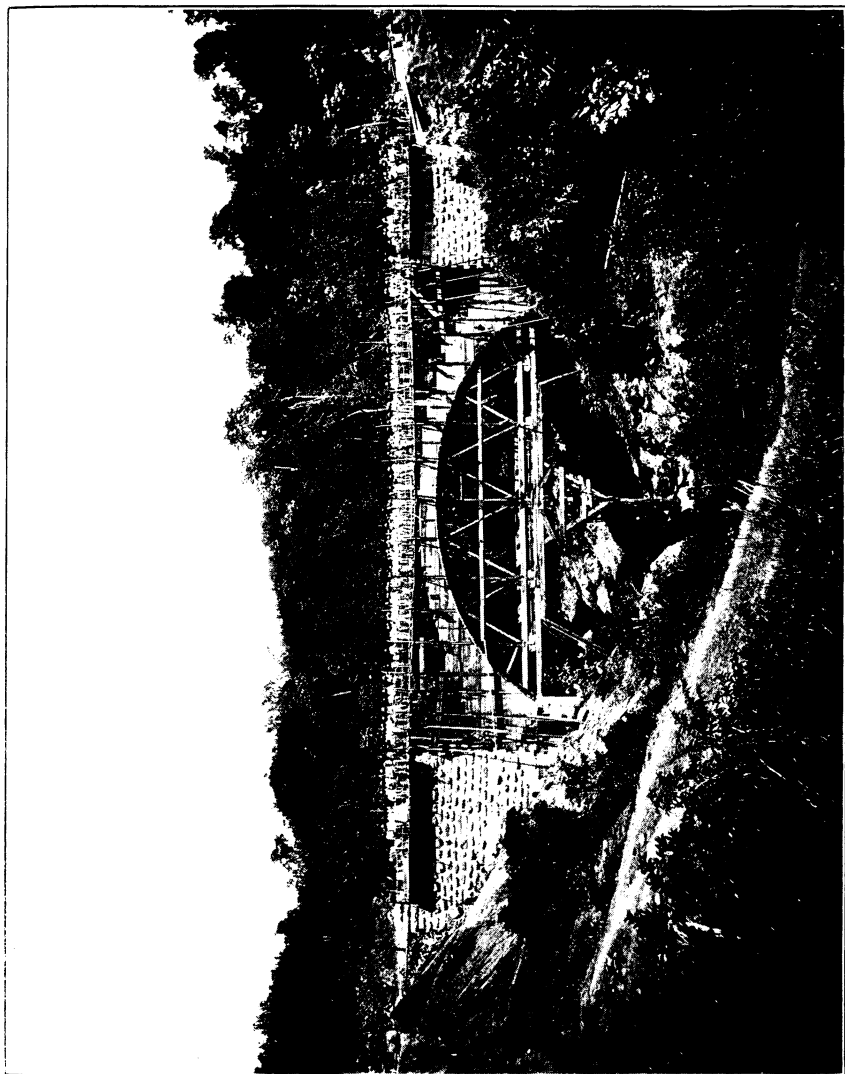
	With piles.	Without piles.
Marix & Co., San Juan.....	\$10,995.00	\$13,565.00
Suceso Paniagua.....	12,880.00	13,502.65
Jose Gonzalez Padin, San Juan.....	13,700.00	13,700.00
F. H. Janes, San Juan.....	8,888.88	10,238.88

The contract was awarded to the lowest bidder, F. H. Janes, who commenced operations the following month. The pier was to be completed on April 2 following. When that date arrived the contractor had driven only the piles for the foundation, 66 in number, and a few sheet piles of the cofferdam. Having met with more difficulties than he had anticipated on account of the many river boulders with which the subsoil was filled, to which contingency attention had been called in the specifications and drawings, and being at a loss how to go about it to overcome these difficulties, the contractor had refused to go on with the work and to ask for an extension of time to complete the work. As the rainy season was approaching and it was imperative to finish or make secure the foundation at least, and as the contractor had not shown sufficient skill during the five months he had accomplished so little, to warrant the placing of any further confidence in his ability to finish the foundation promptly in the face of impending disaster, it was decided to annul the contract at once and to compel his bondsmen to assume all further responsibilities. This action was approved by you and by the attorney-general, to whom the matter had been reported.

The bondsmen have employed a regular bridge builder, who, since June 1, has completed the cofferdam and made the excavation for the concrete footing, his operations being favored by the unusually slack rainy season prevailing this year.

It is proposed, as soon as the pier is finished to invite bids for the erection of the bridge. The expenses are being paid from the balance of a "Trust-fund" allotment made in 1901 for the completion of the Manati-Ciales road.

(b) *Mavilla River bridge*.—The construction of a masonry bridge having a concrete arch of 25½ meters span over the Mavilla River, on the road between Toa Alta and Corozal, had been authorized in 1901, at an estimated cost of \$12,000, and an allotment of the amount had been made from the Trust fund. The work had been advertised to be done by contract, but all the bids received were higher than the available funds, and it was decided to begin the work by day labor and by letting such portions of it as could be readily subdivided in small contracts.



MAVILLA RIVER BRIDGE, AFTER PLACING CONCRETE ARCH, FEBRUARY 17, 1903.



At the beginning of the fiscal year the foundations and the lower portions of the abutments had been built. The center or false work of the bridge, which had been laid out and framed in San Juan, was subsequently shipped to the bridge site and erected, and when the dry season arrived everything was ready for the construction of the concrete arch. Work was begun on the latter on February 12, at 6 p. m., and continued without interruption, with three shifts of 80 men each working eight hours, until February 17, at 1 p. m., when the arch was closed. The total number of cubic meters of concrete placed, made in the proportions of 1: 2: 5—the stone, 1-inch cubes, slightly mixed with screenings and gravel—was 264. The cement used was Atlas Portland, most of which was fresh; about one-third, however, had been stored for several months near the site and its quality had been slightly impaired by dampness; laboratory tests made with it were, nevertheless, satisfactory. The concrete was mixed during the day with a larger percentage of water than is usual, on account of the hot sun. It was noticed afterwards that the night layers, in which less water had been used, did not set as well as those laid during the day and that, in general, a wetter concrete would have been better, especially as it was almost an impossibility to compel the inexperienced laborers to use the rammers with more vigor than they did. The arch was constructed from both ends simultaneously, closing at the center, the concrete being placed in nearly horizontal layers, dipping toward the center of the arch and of about 3 inches in thickness. The finished portions were immediately covered with stout planking braced against the sides of the form, and subsequently all was covered with wet grass.

When the centers were struck, about four months afterwards, there was no settlement noticed upon the crown or upon the haunches, a proof that the arch had passed beyond the first period of resiliency.

A small contract for the placing of 78 cubic meters of masonry and 8 cubic meters of concrete into the wing walls on both ends of the bridge was recently completed, at a total cost of \$721. These walls had to be extended much beyond the original plan on account of the soft subsoil.

The allotment having been expended and the bridge being still unfinished, a request was made to the governor, in May last, for additional funds to complete the work. In explanation of this request it was stated that the expenses had been increased on account of the extension of the approaches, but principally on account of the unforeseen great cost of transportation of all the material, as lumber and cement, to the bridge site. A second allotment of \$3,000 was authorized from the "Trust fund" on June 22 last, to be expended in finishing the spandrel walls and the parapet. This work is to be done by contract and is to begin shortly, it having been awarded to Roque Paniagua.

TABLE No. 7.—*List of bids received August 4, 1903, for the construction of the spandrel and parapet walls of Mavilla River bridge.*

Benjamin Morales, Mayaguez <sup>a</sup> .....	\$2, 618. 00
Roque Paniagua, San Juan <sup>b</sup> .....	2, 838. 00
Jose Lago, San Juan.....	2, 907. 50
Andres G. Canton, Naranjito.....	3, 498. 00
Liborio Sierra, Corozal <sup>c</sup> .....	4, 658. 00

(c) *Submergible bridge across Portugues River.*—When the proposition was entertained to provide some of the principal rivers of the island at the most frequented road crossings with wooden pile bridges, which might serve the purpose for several years until means for more expensive bridges were available, it was decided to build them low enough so that ordinary floods could pass over them without doing much damage, and yet would permit transit across them up to a certain flood level. It is from this special feature that they are designated submergible bridges. An examination had been made of the crossings over the three rivers nearest to Ponce on the San Juan-Ponce road, the Portugues, the Inabón, and the Bucaná, and estimates were submitted for the construction of a bridge of that class for each. After mature consideration it was decided, however, to build one of these at the Portugues River first before undertaking the construction of the others, in order to make observations upon the results and advantages expected, so that any modifications that might suggest themselves could be readily applied thereafter. An allotment for this bridge of \$4,250 was made in December last from the trust fund and the preparation of the plans were begun. The crossing of the river in line with the present road was found to be 130 meters in length and was liable to become greater at any time, as the river

<sup>a</sup> Informal and rejected.

<sup>b</sup> Acceptance recommended.

<sup>c</sup> Informal.

on the west bank is continually eroding the bank and the road on that side. A change in the road to a point about 160 meters below the present line was suggested; it would require new approaches mostly through private land, but the distance across the river at that point is only 50 meters from bank to bank. This location was approved and bids were advertised for.

TABLE NO. 8.—*List of bids received April 21, 1903, for the construction of a wooden submergible bridge over the Portugues River.*

Carlos Clausells, Ponce .....	\$2, 263
Luis Ninlliat, San Juan .....	3, 500
N. Pirazzi, Ponce .....	2, 899
Marix & Co., San Juan .....	3, 795
George C. Scales, San Juan .....	3, 900

The contract was awarded to Carlos Clausells, who promptly commenced work early in May. The work was, however, very much delayed afterwards by one of the property owners, who after having promised previously to give the land on the east approach free under certain minor conditions, became hypercritical as to the proper execution of these conditions and went to the extent of having an injunction put upon the work by the court. These proceedings came near resulting in the abandonment of the bridge. The matter was, however, amicably settled afterwards and work resumed, and, favored by fair weather, satisfactory progress was made, so that the bridge is now finished and will shortly be opened for traffic. The balance of the allotment is sufficient for defraying the expenses for constructing the approaches on both sides, which work is now in progress.

(d) *Submergible bridge across Añasco River.*—Many years ago the old wooden bridge—stated to have been an old-style covered one—which crossed this river on the line of the Mayaguez-Añasco road, was carried away, and since that time a ferry has been established which, however, has always proved inadequate for the heavy traffic passing through this rich section. For some reason only the part of the road leading to the ferry from Mayaguez was always maintained by this bureau, and is, in consequence, in very good order; the portion on the other side of the river, toward Añasco, was neglected, and looks as if it had never been finished. The distance between Mayaguez and Añasco is 9 kilometers, of which less than 3 are situated on the Añasco side of the river. The needs for a bridge were very pressing.

In compliance with a request from the people of Añasco an examination was made of the locality and of the merits of the case, and upon recommendation an allotment of \$8,500 from the Trust fund was made in December last for the construction of a pile bridge similar to the one proposed for the Portugues River. For its location a new site was chosen below the present road crossing. The necessary land for the change in the road has been given free, the people of Añasco paying for the part located on the north side. Plans were prepared after the site had been surveyed and borings made in the river, the length of the bridge to be 87 meters; the channel portion being 46 meters and horizontal, the rest, on the south side, inclined up river and on a 3 per cent grade up to high ground. Bids for the work having been invited, the following were received:

TABLE NO. 9.—*Bids received for the construction of a wooden submergible bridge over the Añasco River, opened June 18, 1903.*

L. Ninlliat, Mayaguez .....	\$4, 620
N. Pirazzi, Ponce .....	6, 400

The contract was awarded to the lowest bidder, L. Ninlliat, who is now preparing to begin work.

#### (7) RECOMMENDATIONS AS TO ROADS AND BRIDGES.

The new law relating to public works, passed March 1, 1902, requires the superintendent of public works at the end of each fiscal year "to make such recommendations as he may deem proper concerning the general policy to be followed with regard to the public works." In the present state of affairs this is delegating rather too much power to the superintendent; that is, I should hesitate to exercise it. As long as the necessary funds for public works are still being supplied largely from a fund which was set aside by President McKinley for purposes which are more or less charitable and special in character, and which is being dispensed in a liberal way by the governor and the heads of departments, it is time to look for a future policy when the present system of dealing out appropriations has been changed.

No one can gainsay the great strides that have been made in the improvement of roads on this island during the past four years, a class of public works probably not less important than building schoolhouses. The beneficial effects of their improvement upon the value of property, the commerce of the seaports, the developing industries of all kinds, and upon the morals of the people can not be denied, and those that have begun and furthered and directed the course of general improvements being carried on now have earned all praise.

To the many recommendations made in the last annual report, pages 23 and 24, for roads and bridges, I have nothing to add. It is somewhat discouraging to see that no notice whatever was taken of them, but the urgency for some of the works mentioned therein remains, especially as to the construction of some of the large bridges.

## II. PUBLIC BUILDINGS AND LANDS.

### (1) MAINTENANCE AND REPAIR OF PUBLIC BUILDINGS.

The expenditure of the appropriation for this division of the public works has been well and economically managed and, as will be seen by appended reports, was principally confined to repair work in this city.

All the department and court offices and the dwellings assigned to the Commissioners and the attorney-general have remained occupied as during the previous years. It is expected, however, that considerable changes and alterations will be called for after the permanent assignment of new quarters and locations has been promulgated, as determined by the recent provisions in the proclamations issued by the President relating to the apportionment of public buildings and lands to the different departments of the Federal and insular governments. The coming year will undoubtedly see and demand a large expenditure for these changes and additions, not only in the capital but in other large cities of the island, of which the greater portion will be needed for the introduction of sanitary plumbing and for better ventilation and light in these old buildings.

The expenses for furnishing light and water to public buildings in San Juan has during the past year considerably increased. The first is furnished under contracts with the Luz Electrica Company and the San Juan Street Railway and Light Company, the latter by the waterworks, owned by the municipality of San Juan. The average price paid for one light of 16 candlepower is 10 cents per kilowatt hour. The price for water was formerly 9 cents per cubic meter, but has been reduced since January 1, 1903, to 5 cents. The consumption of both water and light is registered by meters, the city having made the use of meters compulsory. The expenses for light were for the past year \$5,168.41 and for water \$13,406.52. If there was no probability that shortly the limit of water consumption must be reached, as apparently all the departments are now installed and will likely not be much extended, it would be less expensive to the government to build and own, as suggested in last year's report, its own water supply. There are indications, however, that the municipal water department, which has now a more intelligent and technical superintendence, will in the course of time, after certain improvements have been introduced, be able to furnish water at a very much lower rate than at present.

A detailed account of the expenditures made and the kind of work done in the building division during the past fiscal year, as given by the supervisor of public buildings, is attached to this report under Appendix E.

### 2. SURVEYS AND RECORDS OF HARBOR LANDS, PUBLIC BUILDINGS, AND ADJACENT GROUNDS.

This work was carried on under a budget appropriation of \$3,000. There was special need for this appropriation on account of the pending division of public buildings and reservations, situated at and near San Juan, between the Federal and insular governments. Most of the maps and plans on record were dated many years before the war, showing no improvements, changes, or additions that had been made since. It was therefore decided to make a new survey of all that part of San Juan Island which is situated outside the city walls, including the adjacent channel and water front on the bay side, so that when the repartition is promulgated the respective divisions can be properly located. Besides this extensive survey many minor surveys of the public buildings and adjacent grounds within the city and at other towns were made and plotted, including the reservation for an agricultural experiment station at Mayaguez, the public lands adjoining the west shore of San Antonio Channel, Santurce, and the public lands at Playa Mayaguez.

It is very important that these surveys and filing of proper descriptions and records

regarding public buildings and grounds, including the many reservations around caminero houses along the insular roads, be continued, and I regret to state that the \$2,500 asked for in the estimate for budget appropriations for the year 1903-4, inserted for that purpose, was not appropriated.

The surveyor of public lands and buildings, who had special charge, has rendered the following detailed statement regarding his work, which is translated from the Spanish original:

BUREAU OF PUBLIC WORKS OF PORTO RICO,  
*San Juan, P. R., June 30, 1903.*

Mr. A. STIERLE,

*Superintendent of Public Works, San Juan, P. R.*

SIR: I have the honor to submit herein report of work done in my division during the fiscal year ending this date, as follows:

During the months of July and August, 1902, a survey was made of the estate "Carmen," at Mayaguez, to locate a site for the agricultural experiment station. The area surveyed measures 100.20 hectares, or 245.49 cuerdas.

The auxiliary help for this work was furnished by the municipality of Mayaguez, the technical force being from this office, where also all the plotting was done.

During the month of October, 1902, the work of surveying and plotting the lands on the island of San Juan was commenced. These lands being valuable for construction purposes, it was important to make the survey with the greatest care and accuracy. I employed, therefore, the method of trigonometrical triangulations with two bases, which were measured directly with an allowance of an error of 1 : 10,000, and fixing one side of the triangulation by solar altitude observations, until the astronomical azimuth was obtained with an error of less than two seconds. The lands surveyed have an area of 312.18 hectares, or 761.72 cuerdas.

Another work accomplished was the taking of soundings in the San Antonio channel, which when plotted showed that deposits of material have accumulated there considerably during the last few years.

The last work done on San Antonio bridge during the late period of the Spanish government have modified and interfered with the free flow of the waters and have been undoubtedly the cause of these accumulations.

Soundings were made over an area of 86.45 hectares, or 210.94 cuerdas. In making these soundings I adopted the system of triple intersections from trigonometrical angles, locating the extreme points of the cross sections with wooden stakes.

The location and depths are shown on the plan.

I have made also a survey of the public grounds surrounding the "Olimpo" property at Santurce, the surface measured being 42.23 hectares, or 103.04 cuerdas.

I have plotted the following public buildings: Fortaleza, No. 3, San Juan; Fortaleza, No. 5, San Juan; Diputacion Provincial, San Juan, and, in Rio Piedras, the Convalecencia and the convicts' ward.

All the above work, excepting the survey at Mayaguez for the agricultural experiment station, was paid out of the appropriation of \$3,000 from the regular budget, the amount expended being during the fiscal year \$2,244.58, as follows:

Purchase of instruments and implements .....	\$422. 60
Survey and plotting the island of San Juan .....	1, 184. 05

The total surface measured being 671.72 cuerdas, the average cost per cuerda will be \$1.56.

Soundings in San Antonio channel .....	416. 20
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Area of the soundings, 210.94 cuerdas, which gives an average cost of \$1.97 per cuerda.

Plotting of public buildings .....	163. 43
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Plans of the buildings of Fortaleza, Nos. 3 and 5, are ready.

On the survey of the "Baldios," or public lands at Utuado, in the districts of Santa Rosa and Caguana, there has been expended up to the end of the fiscal year the sum of \$520.88 from an allotment of \$600 transferred from other funds for this purpose with the authority of the executive council. The total surveyed on June 30, 1903, being 1,500 cuerdas, the average cost per cuerda will amount to probably \$0.35.

The boundaries of these public lands have not yet been finished, the work being much interfered with by the opposition of the great number of squatters occupying the land. This survey will be continued and is expected to be completed in two months.

All the observations in the field for the triangulation in connection with the above works have been made by the undersigned, and also all calculations pertaining thereto.



I have employed for the field work two assistants, at a monthly salary of \$60 each, during seven months, in addition to other necessary help to form the surveying party. I had also employed in the office two draftsmen, at \$50 each, for the plotting, during a period of five months.

I have to state that in making the calculations no graphic methods have been used for finding areas, which has been done solely by rectangular coordinates.

Besides the work hereinbefore mentioned in this division, the following has been done:

Plotting and report relative to the maritime zone of the city of Mayaguez.

Copying of plans and report concerning the ownership of lands in the island of Culebra and of the town of San Ildefonso, on the same island.

Plotting and description of metes and bounds of the lands of the battery of "Santo Toribio," the old "Puntilla," and harbor works in the Marina district of San Juan.

Plotting and report on the fort of the Playa de Ponce and adjoining lands.

Plotting and report of fort "Isabel 2a" and adjoining lands at Vieques.

Plotting and report of the barracks at Cayey.

Calculating the number of square meters on the outside of the intendencia and diputacion buildings for estimating cost of painting.

Very respectfully,

ARMANDO MORALES,  
*Superintendent of Public Lands and Buildings.*

### (3) CONSTRUCTION AND SUPERVISION OF PUBLIC WORKS FOR OTHER INSULAR DEPARTMENTS.

The actual expenses incurred in the construction of the following works executed under the supervision of the bureau for other departments were paid by them with special allotments, made after an estimate had been given. The making of the necessary examinations and surveys and of the plans and projects were paid for by this bureau, all the work being done by the permanent employees in the office or by the district engineers at Ponce and Mayaguez.

For the newly created bureau of docks and harbors the following works were planned and constructed:

1. *New wharf at Ponce Playa.*—Was proposed to replace the old landing wharf formerly used and now in bad condition. It is built on piles and is 30 meters long and 5.20 meters wide, and is used for the landing of passengers and baggage only, the total amount expended in its construction being \$998.

TABLE NO. 10.—*Bids received for the construction of passenger wharf at Ponce Playa, opened December 4, 1903.*

Miguel R. Salas, Ponce .....	\$1, 889. 00
Geronimo Anguera, Ponce .....	1, 130. 00
Carlos Clausells, Ponce .....	998. 00
L. R. Denis, San Juan .....	1, 875. 00
Nereo Pirazzi, Ponce .....	1, 250. 00
F. H. Janes, San Juan .....	1, 888. 88

The contract was awarded to Carlos Clausells, who completed the work in February last.

2. *Repairs of wharf at Mayaguez Playa.*—This is the old town wharf, built originally by the town and the harbor works corporation conjointly, upon which all freight is landed from the lighters communicating between the shore and the steamers discharging their cargoes farther out in the harbor. The pier has a pierhead 18 meters wide and 26 meters long, and two approaches 6 meters wide each, from the shore. Many of the piles and floor beams and portions of the flooring were decayed, making the pier unsafe for heavy freight placed upon it. It was proposed to replace all the decayed piles and floor timbers with new material, including other repairs, to make the wharf serviceable. After specifications and an estimate had been prepared the work was advertised, and the following bids were received:

TABLE NO. 11.—*Bids opened March 24, 1903, for repairs to passenger wharf at Mayaguez.*

Victor Honoré, Mayaguez .....	\$2, 569. 74
L. Ninliat, Mayaguez .....	1, 906. 80
H. Gonnard, Mayaguez .....	1, 783. 64
Duffaut & Gonzalez, Yauco .....	1, 743. 83

The contract was awarded to H. Gonnard, as he agreed to complete the repairs one month earlier than the lowest bidder. The work was completed in May last.

3. *Repairs to the bulkhead wall in San Juan Harbor.*—This work consisted in filling up with bags of concrete a large breach which had been made by a steamer running into it, at an expense of \$325. This fact demonstrates the poor condition of the whole wall, which at other points also is falling into pieces. It should be repaired throughout and protected by a fender pile system, which will be expensive work; or a new sea wall should be built farther out, as has been previously proposed.

For the department of justice the following work was done:

4. *Insular jail at Ponce.*—A request was made upon this bureau last February by the attorney-general for the preparation of plans for a new insular jail at Ponce. The request was accompanied with a statement that an appropriation of \$8,000 had been made, and that the city had ceded a building lot at Victoria and Guadalupe streets, about 2 acres in area, for that purpose. As the appropriation was not sufficient for a jail, it was suggested by the attorney-general that a wall might be built around the lot with the available funds until further funds were appropriated.

It was necessary to make a topographical survey of the site and to locate it properly. The survey was made by our district engineer at Ponce, and when the map was finished it showed a very rough, rocky piece of ground, requiring expensive grading to make it suitable for building purposes.

A plot of the ground and a plan and project for an inclosing wall was made and sent to the attorney-general's office on April 30 last. The estimated cost of the wall alone was \$7,200. This office has not been advised since of what action has been taken.

For the superior board of health plans and project for a—

5. *Vaccine station at Rio Piedras* were prepared, the buildings to be constructed under the supervision of the board.

For the insular telegraph bureau certain sanitary plumbing was installed in the telegraph office at Ponce, and the building owned by the insular government at Humacao and used for a telegraph station was put into habitable condition, to both of which reference is made in the appended report of the supervisor of public buildings.

### III. FRANCHISES AND EXAMINATIONS OF NEW PROJECTS, PRIVATE, CORPORATIVE, AND MUNICIPAL.

What has been done during the past fiscal year in the line of these particular duties of the bureau is clearly shown in the accompanying report, marked "Appendix F," of the assistant superintendent, who has had special charge of the examination of all documents referring thereto.

While some of the projects that have been submitted were accompanied by the necessary proper drawings, specifications, and descriptions, prepared in a thorough manner, leaving no doubt about the nature of the subject, and showing clearly that they were treated with expert knowledge, others were sadly deficient in these requirements, and in many cases papers had to be returned to the petitioners more than once requesting additional information. In that manner the final approval has been often delayed, and was at times not executed until actual work had already been begun. I advise the formulation of printed instructions, to be handed to those applying for franchises or asking for the privilege of constructing works of a public nature, supplemented occasionally by similar notices published in newspapers or tacked on the blackboards of each alcadia for the general information of those concerned.

I would also call attention to the difficulty this bureau encounters in enforcing the Spanish police regulations referring to railroads, which, according to an opinion rendered by the attorney-general, are still in force. This bureau has, as now constituted, neither the personnel nor the means to exercise such a supervision as is required by those regulations. In several cases when complaints have been sent to this office the company concerned has been advised by letter of any dereliction of duty and neglect toward the public, and reference was made to a possible imposition of a fine in accordance with the fixed schedule if such practice is continued. In one case, where a fine was imposed about three years ago, the fine was remitted by the governor. It seems to me quite proper for the bureau to exercise a supervision over the technical points involved in construction of these works, old or new, or to an occasional examination of them, but the enforcement of police regulations could well be left, and with more effect, to the police department and the courts, the new civil code affording in many cases sufficient redress for any damage sustained by a suffering public. I think a revision or amending of the old Spanish regulations herein referred to as absolutely necessary.

I have also to repeat the recommendation made in last year's report regarding the advisability of making corporations or individuals seeking and obtaining franchises, concessions, or other privileges, pay the expenses incurred by this bureau in the

examination or correction of plans and projects for new works submitted, and for the inspection of the same when under construction or after their completion. The traveling expenses incurred in connection therewith are now paid from the general appropriation made for that specific purpose in the budget as relating to road and bridge work only. The island should be reimbursed in cash for these expenses, and each plan or set of plans or project submitted and approved should pay a stamp tax of sufficient value to compensate, in a measure, for the time spent and services rendered by the employees of this bureau in facilitating the consummation of a transaction involving the acquisition of valuable privileges and properties.

Very respectfully,

A. STIERLE,  
Superintendent of Public Works.

Hon. W. H. ELLIOTT,  
Commissioner of the Interior, San Juan, P. R.

APPENDIX A.—*Annual report of works executed in the district of San Juan during the fiscal year 1902-3.*

SAN JUAN, P. R., June 30, 1903.

Mr. A. STIERLE,  
Superintendent of Public Works, San Juan, P. R.

SIR: Upon submitting to you my first annual report as road supervisor for the district of San Juan since I qualified on August 2, 1902, I have the honor to state that the service of maintenance of roads as at present organized, following your suggestions, has been considerably improved.

The system established that the road supervisor shall submit "estimates of proposed works" for all works exceeding in cost \$20 has proved highly satisfactory, and especially in that part which refers to the use of broken stone for the various sections. It has done away also with much useless correspondence with the sobrestantes in carrying on the works, in that there exists now a standard for regulating the expenditures to be incurred on the several items which appear on each estimate.

As a complement thereto I have deemed it advisable to draft a set of "Instructions to sobrestantes." In framing these instructions I had in view to compile the results of my personal observation during my tenure of office, added to by suggestions which from time to time you have seen fit to make me, and which, I am pleased to state, have contributed in no small degree to facilitate my work and improve the service. I hope these instructions, after being revised and corrected by you, will prove useful to the sobrestantes for their guidance, so that their duties will be regulated and the methods pointed out which they should follow in carrying out the different operations in connection with the maintenance of roads.

The district of San Juan is divided in 13 sections, covering a total length of 236 kilometers, as follows:

TABLE No. 1.—*Sections of roads under maintenance in the district of San Juan and permanent force employed therein, from July 1, 1902, to July 1, 1903.*

Road No.	Sections.	Length.	Camineros.	Capataces.	Sobrestantes.	Watchmen.	Engine drivers.	Clerk.	Road supervisor.
		<i>Kilos.</i>							
1	San Juan to kilometer 21.....	21	7	2	1	1	1		
1	Kilometer 21 to kilometer 45.....	24	8	2					
5	Caguas to Rio Grande de Loiza.....	3	1	1	1				
1	Kilometer 45 to Cayey.....	16	5	1	1	1	1		
2	Cataño to Vega Alta.....	24	8	1	1				
10	Reyes Catolicos to Corozal.....	17	6	1	1				
5	Rio Grande de Loiza to kilometer 21.....	18	6	1	1			1	1
5	Kilometer 21 to Humacao Playa.....	18	6	1	1				
6	Arecibo to Utuado.....	32	11	2	1				
6	Utuado to Tallones.....	8	5	1	1				
7	Rio Piedras to Mameyes.....	32	10	2	1				
9	Comerio northward.....	4	2	1					
11	Manati to Ciales and Morovis branch.....	19	6		1				
	Total.....	236	81	15	10	2	2	1	1

The sums expended on the permanent force amount to \$37,960, distributed as follows:

TABLE No. 2.—*Sums expended on the permanent force, per annum.*

81 camineros, at \$240 .....	\$19, 440
15 capataces, at \$360 .....	5, 400
7 sobrestantes, at \$900 .....	6, 300
2 sobrestantes, at \$720 .....	1, 440
1 sobrestante, { 8 months, at \$720 .....	480
{ 4 months, at \$900 .....	300
1 watchman, at \$360 .....	360
1 watchman, 8 months, at \$360 .....	240
1 engine driver, at \$720 .....	720
1 engine driver, 8 months, at \$720 .....	480
1 clerk, at \$1,000 .....	1, 000
1 road supervisor, at \$1,800 .....	1, 800
<b>Total</b> .....	<b>37, 960</b>

Therefore, we have for the permanent force the following averages:

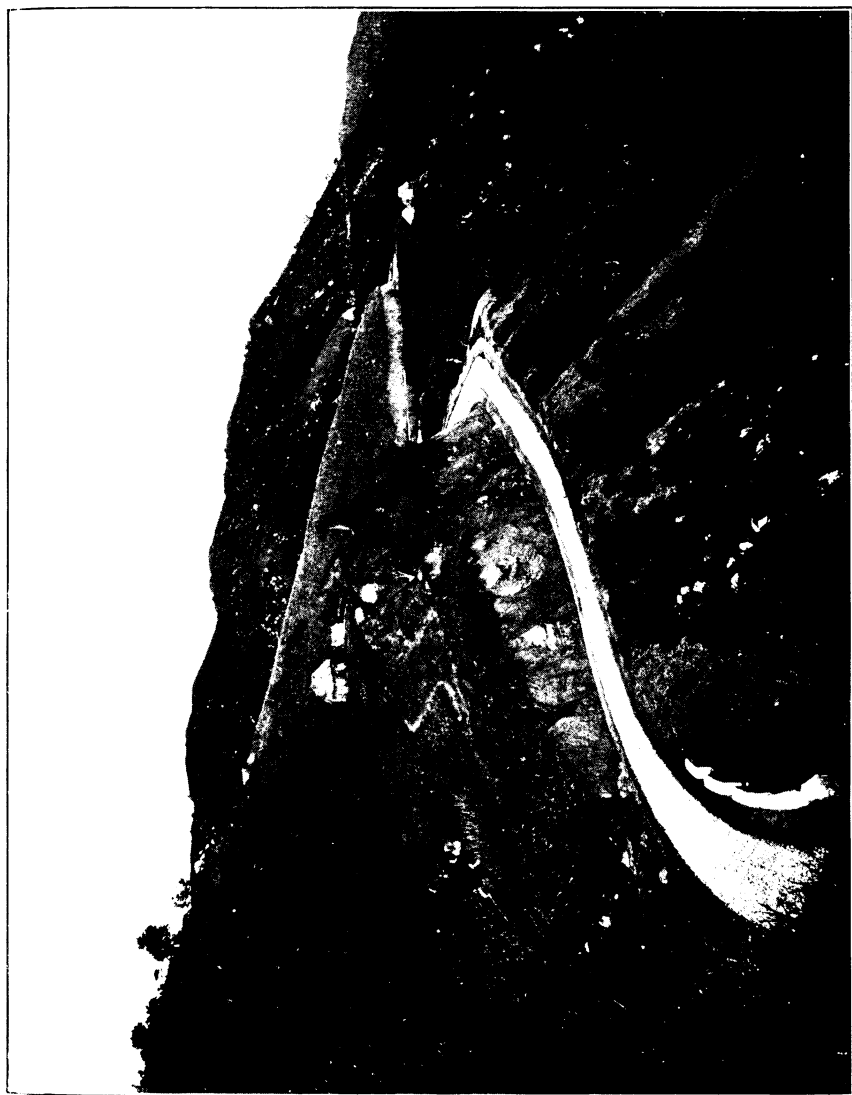
TABLE No. 3.

1 sobrestante, 23.600 kilometers .....	\$852. 00
1 capataz, 15.733 kilometers .....	360. 00
1 caminero, 2.926 kilometers .....	240. 00
<b>Average expense per kilometer, per annum</b> .....	<b>160. 85</b>

The average number of auxiliaries employed by day labor in the district of San Juan may be estimated at 215 for maintenance and of 50 men in the construction of a section of road No. 6, between Utuado and Los Tallones.

The number of men assigned to each section has depended naturally upon the requirements of the service; there have been instances where one section was attended to by 1 caminero and 1 "peon," whereas on other sections the caminero in charge had a gang of 10, 15, and even 20 men working where important repairs and extensive remetaling has been going on.

The average yearly expenditure for the whole auxiliary force is estimated at \$134.75 per kilometer of road.



NEW (UNFINISHED) ROAD BETWEEN YABUCCA AND MAUNABO.



The amount of broken stone purchased by "agreements" has been during the year 13,510 cubic meters, as follows:

TABLE No. 4.—*Broken stone purchased by contract during fiscal year 1902-3.*

Lot No.	Contractor.	Stone.	Price per cubic meter.	Total cost.	Road No.
		<i>Cub. ms.</i>			
1	Pedro Larrosa .....	500	\$1.70	\$850.00	1
2	Gaspar L. Vilá .....	550	1.81	995.50	1
3	Pedro Larrosa .....	475	2.10	997.50	1
4	Manuel Ramirez .....	400	2.00	800.00	1
5	do .....	250	2.00	500.00	1
6	Juan Garcia .....	400	2.19	876.00	1
7	do .....	400	2.19	876.00	1
8	José Rosado .....	400	2.49	996.00	1
9	M. Munitiz .....	400	1.85	740.00	1
10	do .....	400	1.95	780.00	1
11	do .....	400	1.95	780.00	1
12	do .....	550	1.73	951.50	1
13	Gaspar L. Vilá .....	300	2.25	675.00	1
14	Arturo Diaz .....	400	1.73	692.00	1
15	José Rosado .....	200	2.49	498.00	1
16	Inocencio Sanchez .....	500	1.79	895.00	2
17	Manuel Seoane .....	500	1.95	975.00	5
18	Demetrio Garofalo .....	600	1.50	900.00	5
19	Serafin Soto .....	500	1.80	900.00	7
20	Isidoro Louell .....	575	1.50	862.50	6
21	do .....	500	1.50	750.00	6
22	do .....	300	1.50	450.00	6
23	Marix & Co. ....	600	1.48	888.00	6
24	do .....	400	1.48	592.00	6
25	do .....	300	1.40	420.00	6
26	José Roig Colomer .....	200	1.40	280.00	6
27	José Rosado .....	360	2.75	990.00	1
28	José Balado .....	360	2.75	990.00	1
29	José Roig Colomer .....	640	1.40	896.00	6
30	Raoul Marix .....	640	1.40	896.00	6
31	Inocencio Sanchez .....	400	1.79	716.00	2
32	José Balado .....	50	2.75	137.50	1
33	Manuel Seoane .....	60	1.95	117.00	5
	Total .....	13,510		24,662.50	

The average price, therefore, for stone acquired in this manner amounts to \$1.826 per cubic meter.

Besides the 13,510 cubic meters purchased, as shown in the preceding table, there has been used in the district of San Juan other stone out of the amounts remaining from the previous year and that obtained from quarries and slopes in the vicinity of the roads by day labor.

In the following table is shown the total amount of stone spread during the year, how obtained, and the sections where used:

TABLE No. 5.—*Amount of broken stone used in the district of San Juan during the year 1902-3.*

Road No.	Sections.	Broken stone.			Total broken stone.
		From previous year.	Purchased by contract.	By day labor.	
					<i>Cu. m.</i>
1	San Juan to kilometer 21 .....	1,455	1,670		3,125
1	From kilometer 21 to 45 .....	1,347	2,975		4,322
1	From kilometer 45 to Cayey .....	710	2,150		2,860
2	Cataño toward Vega Alta .....		900		900
5	Caguas to Rio Grande de Loiza .....				
5	Rio Grande de Loiza to kilometer 21 .....		560		560
5	Kilometer 21 to Humacao Playa .....		600		600
6	Arecibo to Utuado .....		2,375		2,375
6	Utuado to Tallones .....		1,780		1,780
7	Rio Piedras to Mameyes .....	2,063	500		2,563
9	Comerio northward .....			10	10
10	Reyes Catolicos to Corozal .....				
11	Manati to Ciales .....			728	728
11	Morovis Branch .....	1,565			1,565
	Total .....	7,140	13,510	738	21,388

The 1,565 cubic meters which appear as remaining from the previous year at Morovis section were obtained by day labor, and the 728 cubic meters at Manati-Ciales section were obtained this year by day labor also, at a cost of \$652.43, which gives an average price of \$0.896 per cubic meter.

There have been kept working during the year in the district of San Juan three steam rollers, two of them marked Nos. 1 and 4, respectively, and belonging to the bureau of public works. These two rollers have been doing work at sections 1 and 3 of road No. 1, or "Carretera Central;" the other belongs to private parties, and has been hired by the bureau for rolling the portion of road between Arecibo and Utuado after it was remetaled.

The following table shows the amount of work done by the two steam rollers owned by the bureau and the amount expended for employees, water, and fuel, and also cost of repairs done to them during the year:

TABLE NO. 6.—*Statement of work done and results obtained with the two steam rollers, Nos. 1 and 4, during fiscal year 1902-3.*

	Roller No. 1.	Roller No. 4.	Total.
Work done:			
Length remetaled .....linear meters..	6,728	6,048	12,776
Surface rolled .....square meters..	36,129	30,240	66,369
Average width remetaled .....linear meters..	5.37	5	.....
Average thickness .....do.....	0.116	0.072	.....
Time employed.....days..	117	111	228
Materials:			
Broken stone used .....cubic meters..	4,095	2,150	6,245
Coal.....tons..	28.90	.....	28.90
Wood, per thousand sticks.....	.....	57.50	57.50
Expenses:			
Personnel.....	\$382.20	\$387.00	\$769.20
Fuel.....	260.10	143.75	403.85
Grease, oil, oakum, etc.....	35.50	74.14	109.64
Water.....	120.00	146.00	266.00
Repairs.....	30.00	5.00	35.00
	827.80	755.89	1,583.69
AVERAGES.			
Average expense per square meter rolled.....	\$0.023	\$0.025	\$0.024
Average expense per linear meter of road.....	.123	.125	.124
Average expense per cubic meter of stone used.....	.202	.351	.253

It appears from the above data that the thickness of the metal does not determine any material increase in the cost of the rolling, the average being obtained by taking as a basis the square unit, which in the present case is the square meter.

The average price for ox rolling has been ordinarily 6 cents per square meter. Therefore we have now a saving of 60 per cent in favor of the steam roller. However, in figuring up the average price of \$0.024 per square meter we have also charged the salaries of the employees during the remetaled only; that is, one hundred and seventeen days for roller No. 1 and one hundred and eleven days for No. 4, there being employed for each roller 1 engine driver and 1 watchman during the whole year. It seems logical, therefore, that the balance should be added to this item, which makes the work done by the steam rollers in the district of San Juan during the fiscal year 1902-3 32 per cent cheaper than that done by ox rollers.

Besides this advantage from an economical point of view, I have to state that the work as turned out by a steam roller is far better than that done by the ox rollers and at a saving of time of one-third of the latter.

After having given the above information, as shown in the tables, of a general character and the general considerations relating thereto, I will report on the works carried on in the different sections of roads comprising the district of San Juan.

#### ROAD NO. 1.—SECTION FROM SAN JUAN TO KILOMETER 21.

[Length, 21 kilometers.]

The metaled surface of this section of road, the most important of the district, is wearing out constantly, due to the great amount of traffic over it, not only local but from the outside, as it is the only land route through which communication is obtained between San Juan and a great many towns of the island.

This circumstance, coupled with the fact that materials and means of transportation are very expensive in the vicinity of San Juan, makes the cost of maintenance of this



section of road to average high, which must be endured if the road is to be kept in good shape, as at present.

Besides the general routine work of cleaning ditches, sidewalks, slopes, etc., a length of 3,862 linear meters has been remetaled in this section for a width of 5.50 meters and an average thickness of 0.116 meters.

On this work 2,355 cubic meters of broken stone have been used, at a total cost of \$2.41 per cubic meter, including the value of the stone, and \$0.85 for placing it.

I have to state that out of the 2,355 cubic meters of stone employed, 1,455 cubic meters belong to the balance left the previous year, and the amount to make up the 3,725 cubic meters, as shown in Table No. 5, will be used in next fiscal year.

Four camineros houses and one of a capataz have been repaired, and also the storehouse at Martin Peña, which work has been done under two contracts amounting to \$1,100.

The ironwork of San Antonio bridge has been painted, at a cost of \$309.18, or an average price of \$0.172 per square meter. This bridge, owing to its proximity to the sea, requires painting every year to keep it in good condition.

I would recommend the following works for next fiscal year—1902-3—as the most urgent:

*Broken stone.*—Four thousand cubic meters will be needed for remetaling and patching, especially at kilometers 1, 3, 7, 8, 10, 11, 13, 14, 15, 16, 19, and 20.

*Culverts.*—Repair of culverts located at kilometers 2.33, 17.97, 19.90, and 20.1.

*Road houses.*—Repair and painting of road houses Nos. 5, 6, and 7.

#### ROAD NO. 1, SECTION II, FROM KILOMETER 22 TO KILOMETER 45.

[Length, 24 kilometers.]

This section has been greatly improved during the year.

The following are the principal works executed:

*Remetaling.*—A length of 6,942 linear meters has been remetaled for a width of 5.50 meters and an average thickness of 0.113 meters.

The amount of broken stone employed in this work has been 4,322 cubic meters, of which 1,347 were from the balance left the previous year, and the rest, or 2,975, was furnished by contract this year, corresponding to lots Nos. 1 to 7 in Table No. 4 herein.

Of the 4,757 cubic meters of stone placed on the road 2,185 cubic meters were rolled with steam roller No. 1 and 2,572 cubic meters with ox rollers.

This work has been done at a total cost of \$2.46 per cubic meter, the value of the stone contracted for included, and the hauling of that from the previous year to the place of the works and of \$0.88 per cubic meter for placing it.

*Wooden bridge over Caguas River.*—Upon assuming charge of my duties as road supervisor in August, 1902, repairs to this bridge, which had been destroyed by an overflow of the river on June 18 of the same year, were nearly finished. The expenditures incurred on these repairs during the months of July and August amounted to \$691.13.

The following works are recommended for this section for the coming year:

*Broken stone.*—There will be needed 3,500 cubic meters of broken stone for patching and remetaling, especially between kilometers 32 and 36, inclusive, at a point named Llanura de Caguas, where the thickness of the metaling indicates that no stone has been laid there for a long time.

*Masonry works.*—There are two wooden bridges at kilometers 33.5, named Bairoa, which are in very bad condition and are in need of immediate repairs.

The wooden bridge at kilometer 38.9 is in a similar condition, one beam being decayed, and its repair is also very urgent.

With regard to the temporary bridge across the Caguas River, I have to say that it will not last long, as it lacks solidity. I would therefore recommend that a permanent bridge be built there, viz, an iron bridge with masonry abutments.

*Road houses.*—All the camineros houses in this section were repaired during the previous year, with exception of No. 9, at kilometer 26.5. This house is in a ruinous condition, and its repair will cost no less than \$500.

#### ROAD NO. 1, SECTION III, FROM KILOMETER 45 TO CAYEY.

[Length, 16 kilometers.]

When I assumed charge of the district of San Juan I found this section of road in pretty bad shape, due to the fact that the bidder to whom the contract was awarded for furnishing 6,000 cubic meters of broken stone for the fiscal year 1901-2 failed to comply with his contract, having furnished only 1,000 cubic meters of the amount contracted for, as appears from the papers on file in this office.

There have been employed, in remetaling 6,048 linear meters of road, 2,150 cubic meters of broken stone obtained by contract, corresponding to lots Nos. 9, 10, 11, 12, and 14, in table No. 5, herein.

The total expense per cubic meter for all the stone used in this section has been \$2.22, including the value of the stone and \$0.84 for placing it.

The most urgent work to be done in this section consists in placing 3,600 cubic meters of stone between kilometers 45 and 54.

If this allotment is obtained for the coming year, this section of road will be put in first-class condition, and but slight patching will be required to keep it in good shape for a long time.

All the bridges and culverts in this section are in good condition and no immediate repairs are needed for the present.

The iron material of the bridges, including the large bridge across La Plata River, should be painted.

#### ROAD No. 2, SECTION CATAÑO TOWARD VEGA ALTA.

[Length, 24 kilometers.]

This section of road is in a fairly good condition, as it has been properly attended to during the past two years.

During the closing year there have been placed on this road 500 cubic meters of stone furnished by contract, corresponding to lot No. 16 in table No. 4 of this report.

This stone was placed at kilometers 1, 3, and 16, for remetaling a length of 1,116 linear meters of road 4.75 meters wide and 0.10 meters thick.

The total expenditure for a cubic meter of stone placed has been \$2.75, figuring the value of the stone and \$0.96 for placing it. Two small ox rollers have been used for consolidation in this section.

The most important work executed in this section was the underpinning and protection of the north abutment on the Cataño end of the bridge across the Bayamon River. In this connection I would say that while the repair work was going on I could observe that the damage done by the undermining was more serious than it appeared at first, and that not only the abutment but the whole bridge was in danger. It was therefore a wise and timely measure to carry into effect these repairs, which have saved this bridge from an eventual ruin if it had been allowed to stand without attention during the next rainy season. The expenditures incurred on these repairs amounted to \$1,049.27.

I would recommend the following works in this section of road during the next year:

*Broken stone.*—Two thousand cubic meters will be needed for patching and remetaling, especially at kilometers 4, 6, 8, 9, 10, 11, 12, 15, and 17.

*Bridges and culverts.*—The two small wooden bridges at kilometer 3 are in bad condition and need repairs.

The iron material of the Bayamon Bridge should be painted.

I would earnestly recommend also that the new bridge across La Plata River at kilometer 19 of this road be built, as it is a badly felt necessity.

This bridge should be located at 1 kilometer southward of the present site, and all the iron material from the old Reyes Catolicos Bridge, destroyed, could be used for the new work.

*Road houses.*—The five houses existing in this section need repairs and painting.

#### ROAD No. 5, CAGUAS TO HUMACAO PLAYA.

[Length, 39 kilometers.]

This road is divided in three sections, as follows:

*First.*—Section from Caguas to Rio Grande de Loiza; length, 3 kilometers. This road is under the direct charge of the sobrestante whose headquarters is at Caguas. The same sobrestante is in charge of second section of road No. 1.

*Second.*—Section from Rio Grande de Loiza to kilometer 21; length, 18 kilometers. A sobrestante residing at Juncos is in charge of this section.

*Third.*—Section from kilometer 22 to Humacao Playa; length, 18 kilometers; in charge of a sobrestante residing at Humacao.

Only 1,100 cubic meters of broken stone have been employed on this road during the year, as follows: 500 cubic meters at section 2, between kilometers 4 and 5, and 600 cubic meters at section 3, between kilometers 30 and 31, corresponding, respectively, to lots Nos. 17 and 18 in table No. 4, herein.

With the 500 cubic meters at section 2 a length of 1,050 linear meters was remetaled of a width of 4.50 and an average thickness of 0.106 meters, at a total cost of \$2.89 per cubic meter, including the value of the stone and \$0.94 for labor.

With the 600 cubic meters employed at section 3 a length of 1,900 linear meters was remetaled, 4.50 meters wide and 0.07 thick.

The cost of the stone amounted to \$2.39 and the labor \$0.89.

The consolidation was done with two small ox rollers.

There are now 34 concrete and masonry culverts under repairs on this road, which work is being done by contract with D. M. Palmieri, dated May 19, 1903.

These repairs will consist in the construction of protecting walls in foundations and paving of 33 culverts and the reconstruction of a culvert which was destroyed by the waters at kilometer 5 - 643.

The total work contracted for amounts to \$6,373.55, there being a special appropriation of \$7,000 therefor.

As these works were commenced only a month ago, the time for the execution of the work being five months, I would say that so far the works have suffered no interruption, and that they are being carried out in strict accordance with the specifications.

The following work is recommended for this road during the coming year:

*Broken stone.*—The broken stone necessary for this road amounts to 6,100 cubic meters, distributed as follows: 600 cubic meters for section 1; 3,500 cubic meters for section 2; 2,000 cubic meters for section 3.

*Bridges and culverts.*—There are on this road three large water courses which should be spanned with bridges, as follows: Río Grande de Loiza, at kilometer 3; Quebrada "Maney," at kilometer 10.2, and Río Valenciano, at kilometer 14.1.

As a permanent bridge across the Río Grande de Loiza and across Río Valenciano would be very expensive, I would respectfully suggest the construction of two submergible bridges thereon, of timber, which would satisfy the needs of traffic for some time to come and save much of the present inconvenience to travelers.

With regard to Quebrada Maneyes I would recommend the construction of a bridge of 10 meters span, of native timber, on masonry abutments.

#### ROAD NO. 6, SECTION ARECIBO TO UTUADO.

[Length, 32 kilometers.]

The following works have been done in this section of road:

*Remetaled.*—A length of 3,188 linear meters has been remetaled for a width of 6 meters and an average thickness of 0.125, requiring 2,375 cubic meters of broken stone, obtained by contract, corresponding to lots 20 to 24 in table No. 4, herein.

The total cost per cubic meter amounted to \$2.45, including the value of the stone and \$0.99 for placing it.

*Masonry works.*—A culvert was built at kilometer 19+566, of 2.50 meters span, in the place of two small drainpipes constructed by the military engineers, which proved an inadequate outlet for the waters during overflows, washing away the macadam and destroying everything in its course.

This culvert was built by contract, at a cost of \$540, by Marix & Co.

The following works are the most needed in this section:

*Broken stone.*—Four thousand cubic meters of broken stone will be needed for patching and remetaled at various points.

*Bridges and culverts.*—It is of the utmost importance to repair the flooring of the following Spanish iron bridges: Kilometer 27.5 of 3 meters span, kilometer 27.7 of 2 meters span, kilometer 28.3 of 6 meters span, kilometer 28.5 of 3 meters span, kilometer 30.2 of 10 meters span, kilometer 30.4 of 10 meters span. These repairs will amount to about \$1,000.

I beg to inform you also regarding the advisability of building a new bridge across the Río Grande de Arecibo at the entrance of the town of Utuado. There existed, during the Spanish régime, at this site an iron bridge 42 meters span, which was carried away by the waters during the cyclone of August, 1899.

#### ROAD NO. 6, SECTION UTUADO TOWARD LOS TALLONES.

[Length, 8 kilometers.]

The building of this section of road was commenced during the military government by the military engineers, starting work at different points, with the result that only a few small portions were finished of a total length of 2,029 linear meters.

The sobrestante in charge reports the following work executed during the year 1902-3:

Increased to 6 meters the width of the road at points constructed by the military engineers.

Completed 1,577 linear meters of road between kilometer 3 and kilometer 5.

There are men working now in a large cut through rock at kilometer 6, extending over a length of 942 linear meters.

The portions of this road which are finished are under regular maintenance.

There is a gap of 3,720 linear meters to complete this section of road. The unfinished portion being partially graded, its construction would cost from \$10,000 to \$12,000.

#### ROAD No. 7, SECTION RIO PIEDRAS TO MAMEYES.

[Length, 32 kilometers.]

The amount of broken stone used on this road has been, during the year, 2,563 cubic meters, of which 500 meters were obtained by contract, corresponding to lot No. 19 in Table No. 4, and the balance of 2,063 cubic meters came from the previous year's stock.

A length of 5,094 linear meters has been remetaled, 4.50 meters wide and of an average depth of 0.11 meters.

Out of the 5,094 linear meters remetaled, a length of 883 linear meters was consolidated with the steam roller, using ox rollers for the balance of 4,211 meters.

The total cost of this work amounts to \$2.56 per cubic meter, including the value of the stone, and for labor, \$0.76.

The following works are recommended for next fiscal year on this road:

*Broken stone.*—About 3,000 cubic meters will be needed for patching and remetaling, especially at kilometers 3, 7, 8, 9, 10, 22, 23, 24, 25, and 26.

*Road houses.*—The five camineros houses on this road are in need of repairs.

*Bridges and culverts.*—There is much important work to be done on this road in the matter of bridges and culverts.

The following repair work should be done as the most urgent:

1. Bridge of 9.80 meters span at kilometer 18 + 249 needs protection work to stop the undermining now going on, which will sooner or later put the bridge in danger. Cost of repairs are estimated at \$250.

2. Replacing the wooden trusses of the following culverts: Culvert of 2.25 meters span at kilometer 9 + 310; culvert of 1 meter span at kilometer 11 + 850; culvert of 0.80 meter span at kilometer 23 + 586; culvert of 2 meters span at kilometer 23 + 910. Estimated cost, \$150.

3. Constructing connecting walls in foundations, and pave the following 4 culverts: Culvert of 2 meters span at kilometer 29 + 175; culvert of 2.20 meters span at kilometer 29 + 576; culvert of 2 meters span at kilometer 29 + 738; culvert of 2 meters span at kilometer 32 + 400. Approximate estimate, \$350.

4. Culvert of 6 meters span at kilometer 12 + 990, across Quebrada Candelaria. This culvert is entirely destroyed, with the exception of the western abutment, which can be used if the work is reconstructed, but would require some protection work in the foundation. Approximate estimate, \$2,000.

5. Polaco bridge 7.50 meters span at kilometer 22 + 625. This bridge is in total ruin. The old iron material could be used upon new masonry abutments. This work could be done at an approximate cost of \$2,500.

6. There are thirteen iron trusses, with an approximate surface of 1,900 square meters, which need scraping and painting. Approximate estimate, \$380.

In order to carry out the above-cited repairs an appropriation of \$6,000 would be needed.

With regard to construction work I would say that there are three important bridges to be built on this road across the following rivers: Rio Grande de Loiza, at Carolina; Rio Grande at Rio Grande, and Rio Espiritu Santo.

At Rio Grande de Loiza this department is running day and night a river ferry at a considerable yearly expenditure, for which reason I would recommend the construction of a timber submergible bridge.

For spanning the second river, or Rio Grande, the iron structure of 34 meters which we have at Carolina could be used there as a permanent bridge; and for the Espiritu Santo the best and most economical solution would be for the present a timber bridge, there existing the advantage that native wood is abundant in the locality, due to its proximity to the Luquillo Mountains.

There are 900 meters of completed road which can not be used now for lack of the two last-named bridges.

## ROAD No. 9, SECTION COMERIO NORTHWARD.

[Length, 4 kilometers.]

This small section of road is in charge of one capataz and two camineros and is kept in fairly good condition.

Only 10 cubic meters of broken stone have been placed on this portion of road during the closing year, besides the general routine work in connection with the regular service of maintenance.

## ROAD No. 10, SECTION REYES CATOLICOS TO COROZAL.

[Length, 17 kilometers.]

No stone has been used on this road during the year; nothing but general work of maintenance.

There is a portion of this section, between Toa Alta and Corozal, presenting a rough and uneven surface.

It appears that the macadam was not sufficiently consolidated when the road was constructed, and there are some embankments that have settled considerably.

In this connection I would recommend the purchase of a steam roller for this road, to make good in a short time the deficiencies recited, at a comparatively slight expenditure.

The following repairs are the most needed for this road during the next fiscal year:

*Broken stone.*—To patch and remetel the worst points at this section there will be needed 2,500 cubic meters of broken stone.

*Masonry works.*—Old bridge across Rio Lajas at kilometers 2.2. The wing wall on the east side of the abutment on the Toa Alta side is out of level and separated from the general body of the abutment. It has been necessary to prop this wall with solid pieces of timber to prevent its falling, which undoubtedly would cause material damage to the bridge. The repair of this wall I deem very urgent, and \$600 will put it in a safe condition.

*Marilla River Bridge.*—The construction of this concrete masonry bridge has been under the personal supervision of yourself and of Mr. J. J. Jimenez, general inspector, and will undoubtedly be reported upon in another part of the report.

## ROAD No. 11, SECTION MANATI TO CIALES.

[Length, 13 kilometers.]

The length remetaled on this road amounts to 1,980 linear meters. The width of the macadam has been 4.50, and the average depth 0.09 meters. Seven hundred and twenty-eight cubic meters of broken stone have been employed on this work, obtained from the slopes of the road by day labor. The cost of this work per cubic meter, including the stone, amounts to \$1.85, and for labor \$0.96.

There were placed by contract 72 wheel guards at different culverts on the section at a cost of \$2.90 each, furnished by Mr. José Lago, whose bid was the most advantageous for the administration.

Necessary works of this road during the coming year:

One thousand five hundred cubic meters of broken stone for patching and remetaling, especially at kilometers 7 and 13; replacing of hectometer posts throughout the section; to remove to near the roadside the "campamento" house belonging to the bureau of public works.

The masonry works along the road are all in good condition and do not need any repairing work.

On this road we meet with two important water courses which are not spanned. I refer to Rio Manati Paso de Mata Platanos and Rio Cialitos. At Mata de Platanos works for a central pier are being executed by contract and there is an iron structure 80 meters long laid up near the bridge site ready for erection.

At Cialitos River there are two concrete abutments built some time since, and it would be advisable to place an iron bridge 34 meters span on them.

## ROAD No. 11, MOROVIS BRANCH.

This road extends over a length of 12 kilometers, of which 8 kilometers have a road-bed of macadam of 3 meters width in 6 kilometers and 4.50 meters wide in the remaining 2.

The latter have been completed this year, at a cost of \$1,733.95, including the fixing of the grading, spreading the stone, rolling, side ditches, etc.

The remaining unfinished portion of 4 kilometers is almost totally graded, all the masonry works, including the abutments for the bridge across Morovis River, of 21.50 span, having been constructed; therefore, I would recommend that an allotment of \$8,000 be asked for the completion of this section of road, leaving out the iron material for the bridge, which requires a special allotment.

## RECAPITULATION.

## Broken stone:

Total length remetaled.....	kilometers..	33.366
Total amount of broken stone used.....	cubic meters..	18,878
Cost of the stone obtained by day labor.....	per cubic meter..	\$0.896
Average cost of stone furnished by contract.....	do.....	\$1.826
Average cost of placing stone.....	do.....	\$0.876

*Statement of expenses incurred per kilometer of road in the district of San Juan during fiscal year 1902-3.*

	Per kilometer.
Permanent force .....	\$160.85
Auxiliaries .....	134.75
Broken stone purchased .....	107.26
House rents, repairs to road houses, bridges, and culverts .....	16.40
Contingent expenses, carts, teams, etc.....	47.08
Total expended per kilometer.....	466.34

With regard to extraordinary services independent from the maintenance of roads, the only one I have rendered has been the inspection of the works, after being completed, of the municipal hospital of Manati, the acceptance of which I recommended to the assistant superintendent in a report I made to him relative thereto dated April 27, 1903. I have also been directed to attend to the final reception of works in connection with sewerage system for the northern part of the city of San Juan, which is still pending.

Respectfully submitted.

F. MONTILLA, *District Engineer.*

APPENDIX B.—*Annual report of works executed in the district of Ponce during fiscal year 1902-3.*

PONCE, P. R., July 3, 1903.

MR. A. STIERLE,

*Superintendent of Public Works, San Juan, P. R.*

SIR: I have the honor to submit to you the following report of work done during fiscal year ending June 30, 1903:

## ORGANIZATION.

The district of Ponce embraces at present a total of 173 kilometers of roads, 140.6 kilometers of which are under maintenance and the rest under construction. The 140.6 kilometers under maintenance are divided in sections, in the following manner:

Section.	Road No.	Between kilometers.	Length.
			<i>Kilometers.</i>
1	1 and 4	60 to 70 and 1 to 12.....	22
2	1	70 to 90 .....	20
3	1	90 to 110 .....	20
4	1	110 to 130 .....	20
5	4	13 to 34.6 .....	21.6
6	6	1-3 to 1-23 Playa-Adjuntas .....	26
7	6	23 to 34 through Adjuntas .....	11
		Total .....	140.6

Each section is attended by one overseer, a foreman, and a number of camineros, which number changes according to the length of sections, the average being 3 kilometers for each caminero. The camineros are also assisted by laborers, two for each one, when the needs of service demand it, especially in the rainy season, when the

growing of grass is greater and the landslides more frequent. When these landslides are of importance and it is necessary to have the road soon cleared, then two camineros with their laborers are employed; and if this is not sufficient a larger force of laborers is employed.

The camineros are obliged to make daily reports of work done to the foreman of the section, who reports to the overseer. The overseer in his daily inspection checks the foreman's report and notes other information which can not be taken by the foreman. A general report of the work is sent to this office every half month, and a monthly report is sent to the principal office at San Juan.

The road supervisor makes an inspection visit at least once a month of each section.

Before undertaking any work requiring more force than that permanently employed an estimate is made and submitted for the approval of the superintendent of public works.

## BROKEN STONE PURCHASED.

During the fiscal year 1902-3 stone has been furnished by contract in places where wanted, amounting to 3,025 cubic meters, as shown by the following table:

TABLE NO. 1.—*Broken stone purchased.*

Location.	Number of cubic meters.	Price per cubic meter.	Total cost.	Date.
Section 1, kilometer 61 to 65.....	499	\$1.90	\$948.10	Feb., 1903
Section 3, kilometer 94 to 110.....	580	1.65	957.00	Nov., 1902
Section 4, kilometer 116 to 126.....	617	1.59	981.03	Dec., 1902
Section 5, kilometer 32.....	499	2.00	998.00	Do.
Section 6, Playa.....	415	2.40	996.00	Oct., 1902
Do.....	415	2.40	996.00	Nov., 1902
Total.....	3,025	a 1.94	5,876.13	

a Average.

## BROKEN STONE PLACED.

This stone has been used in patching in the different sections; also some more that we had stored as a balance of that purchased last year, and some that we have taken from the slopes next to the places where we had to employ it.

The following table shows the stone used, the places where it has been used, the total cost, the average cost per square meter placed, and the surface of the road covered.

TABLE NO. 2.—*Broken stone placed during fiscal year 1902-3.*

Section.	Placed.	Surface covered.	Total cost.	Average cost per square meter.
	<i>Cu. m.</i>	<i>Sq. m.</i>		
1.....	1,499	16,558	\$1,370.39	\$0.08
2.....	1,152	13,092	1,594.60	.12
3.....	609	8,125	687.02	.08
4.....	1,318	14,083	1,520.17	.10
5.....	1,095	9,288	1,399.80	.15
6.....	1,625	21,046	1,581.74	.07
7.....				
Total.....	7,325	82,192	8,153.72	.09

Were we to obtain the average of the total cost of the cubic meter purchased and placed, we should have to reduce from the \$8,153.72, the price of obtaining the 800 cubic meters, approximately, which were taken from the slope, at \$0.60 per cubic meter, \$480, and then we will have for placing the 7,325 cubic meters an average cost of \$1.04.

Of this 7,325 cubic meters 3,025 cubic meters (Table 1) were bought this year; of

the balance, 4,300 cubic meters, 3,500 cubic meters were left from the contracts of the year before, and the 800 cubic meters were taken from the slope.

The average cost for purchasing the 3,025 cubic meters is.....	\$1.94
Placing.....	1.04
	<hr/> 2.98
The average cost when purchasing the 3,500 cubic meters in 1901-2 was.....	1.69
Placing.....	1.04
	<hr/> 2.73
The average cost of the 800 cubic meters taken from the slopes is.....	.60
Placing.....	1.04
	<hr/> 1.64

Computing the total average with these records and considering the number of cubic meters in each case I find \$2.60 as average cost of purchasing and placing 1 cubic meter during year 1902-3.

We have also to consider that the largest part of this stone has been employed in patching, when the cubic meters in place cover more surface of road, being, of course, more expensive on account of rolling.

#### REPAIRING AND PAINTING BRIDGES, CAMINEROS HOUSES, AND CULVERTS.

Many of these works have been done by small contracts under previously approved estimates, alike as for the purchasing and use of broken stone.

The places where they have been made, their kind, and the cost of the works are shown in the following table:

TABLE No. 3.—*Repairing and painting bridges, camineros houses, and culverts.*

Section.	Kind of work done.	Cost.
1	Small repair to culverts.....	\$112.58
3	Painting Coamo bridge, repairs to camineros house No. 26, and repairs to culverts..	744.21
4	Repairs to culverts 43 and 45 and to caminero houses 26, 27, and 28.....	501.62
	Total.....	<hr/> 1,358.41

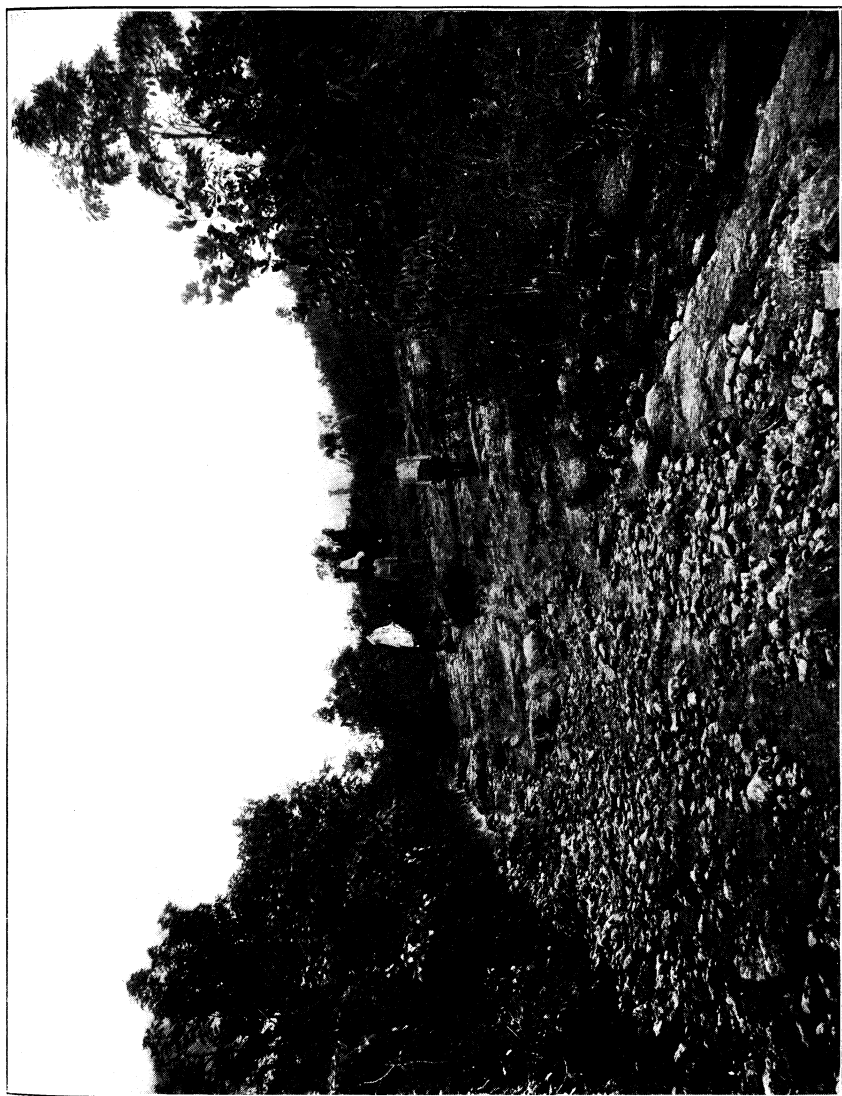
Much is yet left to be done in this work of repairing and painting bridges. In section "Needs of Ponce district for the year 1903-4" of this report, the most important works of this kind are pointed out.

#### PAVING DITCHES, CONSTRUCTING DRY RETAINING WALLS, PARAPETS, AND REVETMENT WALLS.

We have often to make these works in the different sections in order to protect the road from the river floods and the erosion of waters, and on the curved ditches and on steep grades to avoid land slides and to protect the traffic.

During the year we have attended as much as possible to this matter, which must be done somewhat slowly, as far as the circumstances demand and the money allows us to do, and we try to make the most important first.





OLD ROAD BETWEEN SAN SEBASTIAN AND LARES.



The following table shows the number of cubic meters of stone employed in these works in the different sections, as well as the total cost and the average cost per cubic meter:

TABLE NO. 4.—*Paving ditches, constructing dry retaining walls, parapets, and revetment walls.*

Section.	Cubic meters of stone used.	Total cost.	Average per cubic meter.
1.....	14	\$11.33	\$0.71
2.....	60	49.54	.82
3.....	170	162.10	.91
4.....	644	462.67	.72
5.....	35	30.97	.88
6.....	165	181.99	1.10
7.....	176	114.80	.65
Total .....	1,264	1,013.40	.80

CLEARING OF LAND SLIDES.

In the sections located through the mountains land slides are frequent. During the year 1902-3 we have removed 6,040 cubic meters in the different sections, as is shown in the following table:

TABLE NO. 5.

Section.	Cubic meters removed.	Cost.	Average per cubic meter.
1.....	818	\$108.95	\$0.13
2.....	1,677	278.63	.16
3.....			
4.....	37	5.16	.13
5.....	1,993	237.78	.11
6.....	1,455	172.17	.11
7.....	60	10.40	.17
Total .....	6,040	813.09	.13

CLEANING OF DITCHES, SIDEWALKS, SLOPES, ROADWAY, AND DRAINS.

The works, which are constantly going on on the roads, increase largely during the rainy season.

In the following table is shown by separated sections the average cost:

TABLE NO. 6.

Section.	Length in kilometers.	Cost.	Average per kilometer and per year.
1.....	22	\$1,687.05	\$76.68
2.....	20	1,996.76	99.83
3.....	20	1,428.55	71.42
4.....	20	1,339.82	67.00
5.....	21.6	1,617.84	74.43
6.....	26	1,809.57	69.60
7.....	11	1,041.34	94.66
Total .....	140.6	10,920.93	77.67

In this cost the big part of camineros salaries and laborers is included.

## CLEANING BRIDGES AND CULVERTS.

For cleaning bridges and culverts in the different sections we have expended \$439.82, distributed as follows:

TABLE NO. 7.

Section 1.....	\$108.39
Section 2.....	42.60
Section 3.....	86.11
Section 4.....	68.40
Section 5.....	43.90
Section 6.....	22.58
Section 7.....	67.84
Total .....	439.82

## OTHER WORKS.

Besides the work already stated a series of small works has been made which is difficult to enumerate one by one, such as purchasing of tools, hauling of rollers from one section to another, repairing and purchasing of hectometric posts, removing the storehouse for tools from Ponce Playa to the office yard at Ponce, rent of camineros houses, removing Portuguese bridge, smoothing road surface of Adjuntas section, watching of camineros, absences, granting of permission for removing and building houses, sickness, holidays, etc.

The total of money expended for that purpose appears in detail and by separated sections in the following table:

TABLE NO. 8.

Section 1.....	\$702.04
Section 2.....	702.01
Section 3.....	614.32
Section 4.....	580.99
Section 5.....	750.82
Section 6.....	1,744.07
Section 7.....	1,124.87
Total .....	6,219.12

## SPECIAL WORKS.

Besides the ordinary maintenance I have had to attend other works of different kinds.

First. During two or three months the work that was going on on the road from Ponce to Guayama was under my charge. Having had the honor of sending you in February, 1903, a general report concerning the works done during the time that such road was under my charge, there is no use to repeat it here.

Second. The studies for the location of the three bridges over the rivers Portugues, Bucaná, and Inabon.

Third. Inspection of the construction of a passenger wharf at Ponce Playa for the harbor and docks department.

Fourth. Inspection of Jueyes River for the taking of water, by Mr. Usera.

Fifth. Inspection of franchise granted to Lothrop for building an electric tramway from Ponce to the Playa.

Sixth. Inspection of franchise granted to the same company for lighting purposes.

Seventh. Inspection of franchise of the American-Porto Rico Railroad Company.

Eighth. Making of the plot of land granted by the municipality of Ponce to the people of Porto Rico for the construction of a prison.

Ninth. Inspection of the construction of bridge over Portugues River, now in progress.

## SUMMARY OF MONEY EXPENDED DURING FISCAL YEAR 1902-3.

*Inspection force.*

1 road supervisor, at \$1,800 per annum.....	\$1,800
1 clerk, at \$720 per annum.....	720
1 janitor, at \$360 per annum.....	360
7 overseers, at \$900 per annum.....	6,300
8 foremen, at \$360 per annum.....	2,880
Total .....	12,060

Section men and laborers are included in the money expended for doing the other different works.

Salaries of engine driver and watchman of steam roller are also included in the money expended in the other different works.

## SUMMARY.

Table No. 1 .....	\$5, 876. 13
Table No. 2 .....	8, 153. 72
Table No. 3 .....	1, 358. 41
Table No. 4 .....	1, 013. 40
Table No. 5 .....	813. 09
Table No. 6 .....	10, 920. 93
Table No. 7 .....	439. 82
Table No. 8 .....	6, 219. 12
Inspection force .....	12, 060. 00
Traveling expenses .....	112. 91
Grand total .....	46, 967. 53

This gives an average expenditure of \$334.01 per kilometer and per year.

## NEEDS OF PONCE DISTRICT FOR THE FISCAL YEAR 1903-4.

One of the works needed in this district during the fiscal year 1903-4 is the purchasing and placing of broken stone in the different sections. Many sections have not been remetaled for a long time and are wanting repairing.

In the following table the number of cubic meters of stone needed is stated, as well as the average estimated price at which it can be obtained in each section.

*Broken stone to be purchased, year 1903-4.*

Section.	Cubic meters needed.	Average price per cubic meter.	Total cost.
1.....	4, 000	\$1. 90	\$7, 600. 00
2.....	4, 400	1. 80	7, 920. 00
3.....	3, 200	1. 75	5, 600. 00
4.....	3, 000	1. 75	5, 250. 00
5.....	2, 000	1. 90	3, 800. 00
6.....	2, 500	2. 00	5, 000. 00
7.....	2, 000	1. 50	3, 000. 00
Total .....	21, 100	.....	38, 170. 00

To place this stone I estimate an average cost of \$0.70 per cubic meter, and for the total, \$14,770.

Another important need of this district is the painting and repairing of bridges, camineros houses, and culverts.

In the following table appears approximately the necessary money in each section for this work:

*Bridges, culverts, and camineros houses to be repaired and painted.*

Section 1 .....	\$300
Section 2 .....	250
Section 3 .....	1, 350
Section 4 .....	1, 600
Section 5 .....	350
Section 6 .....	1, 880
Section 7 .....	580
Total .....	6, 310

Besides this work we need to build some walls for protecting traffic, ditches, and embankments. With an appropriation of about \$2,000 we could make the most important in this line.

To purchase and repair tools we will need for all the sections about \$1,000.

A summary of the needs of this district is found below:

Broken stone, material.....	\$38,170
Broken stone, labor.....	14,770
Repairs to bridges, culverts, etc.....	6,310
Parapet walls.....	2,000
Purchase of tools.....	1,000
Rent of camineros houses.....	200
Office and field force.....	25,980
One hundred laborers.....	12,000
Contingent expenses.....	5,000

Grand total.....	105,430
------------------	---------

Respectfully submitted.

R. DEL VALLE Z., *District Engineer.*

APPENDIX C.—*Annual report of works executed in the district of Mayaguez during fiscal year 1902-3.*

MAYAGUEZ, July 1, 1903.

SUPERINTENDENT OF PUBLIC WORKS,  
*San Juan, P. R.*

SIR: In compliance with your request of date May 20, 1903, I have the honor to submit herewith a report covering all work done on all sections of roads of the Mayaguez district during the fiscal year ending June 30, 1903:

MAINTENANCE OF ROADS.

The total number of kilometers maintained by this division during the past year is 68.50, forming the following sections:

	Kilometers.
Road No. 2, section Aguadilla to Quebradillas.....	7.00
Road No. 2, section Mayaguez to Añasco River.....	8.80
Road No. 3, section Mayaguez to San German.....	20.00
Road No. 8, section Aguadilla to San Sebastian.....	23.70
Road No. 14, section Consumo to Las Marias.....	9.00
Total.....	68.50

ROAD NO. 2, SECTION AGUADILLA TO QUEBRADILLAS.

MAINTENANCE.

After the repairs made last year on the Aguadilla Hill, and at the site near Guajataca Bridge, six camineros were named to take charge of the section finished.

No extra work has been accomplished by them, as they only were in charge of maintaining the 7 kilometers which had been constructed.

The total cost for maintenance of these 7 kilometers was as follows:

Salaries.....	\$1,303.44
House rent.....	48.00
Incidental expenses.....	10.00
Total.....	1,361.44

When the repairs now going on are completed this section from Aguadilla to Camuy will be 41 kilometers long.

ROAD NO. 2, SECTION MAYAGUEZ TO AÑASCO RIVER.

Besides the routine work of maintenance the only extra work accomplished during the year by the regular force was the repairing of four wooden culverts, which were liable to collapse at any time, and the placing of 200 cubic meters of broken stone, which were purchased by contract.

To repair the culverts nearly 4,000 linear feet of timber were purchased, making the total cost of work and material \$130.02.

The stone purchased by contract cost \$1.60 per cubic meter, or \$320 total cost, and the expense for laborers and hire of teams amounted to \$165.75, making the cost of 1 cubic meter in place \$2.43.





ROCK BLAST IN THE ROAD UNDER CONSTRUCTION FROM SAN SEBASTIAN TO LARES.



*Synopsis of expenses during the year on road No. 2.*

Supervising and laboring force .....	\$2, 072. 54
Rent of tool shed.....	0. 00
Repairs to bridges and culverts.....	114. 00
Incidental expenses .....	437. 53
<b>Total .....</b>	<b>2, 624. 07</b>

The cost of maintaining one kilometer was, therefore, \$291.

All masonry culverts on this section are in need of repairs, which I respectfully recommend to be done as soon as possible.

Also the macadam must be improved, for which 2,000 cubic meters of stone should be purchased during the first part of next fiscal year.

## ROAD NO. 3, SECTION MAYAGUEZ TO SAN GERMAN.

During the year many good improvements have been done to this section, and the total length of the road is now in a much better condition than what it was a year ago. Two wooden bridges have been repaired, and 1,000 cubic meters of broken stone were purchased and placed where the macadam was found to be all worn down to the bottom.

The regular force in charge of this section have done their best to have the road cleaned and well drained. A fair amount of work was accomplished by each man, especially during the rainy season, when culverts, ditches, and embankments were obstructed and destroyed.

## WORK DONE BY CONTRACT.

*Repairs to the floor and railing of Mirasol Bridge.*—After the estimate was submitted and approved, bids were requested from different parties, and the work was awarded to the lowest bidder for the amount of \$242, being \$2.56 less than the approved estimate.

The work was commenced on January 20, 1903, and completed on January 30, 1903.

The floor and railing were placed new, and some of the floor beams and one girder were repaired, the contractor having employed on this work 4,000 linear feet of timber.

*Repairs to the floor of Baden Bridge and the filling in of the embankment of the north side.*—The estimate submitted for this work amounted to \$158.50, and the lowest bidder offered to do the work for the amount of \$160.

The work was started during the first half of January and completed at the end of the same month.

It consisted in reconstructing the embankment on the north side of the bridge and covering it along the edge and up to the flood line with large riprap. Nearly 250 cubic meters of earth were needed for the embankment, and 1,000 linear feet of timber were used to repair the floor.

This same bridge was strengthened afterwards in order that the steam road roller could cross it. The work was done by contract for the amount of \$10.

*Construction of a third-class masonry wall and the filling in of the embankment of the south side of Pezuela Bridge.*—The Pezuela Bridge is located at kilometer 14 on the main road to San German and is one of the best bridges of this section; but the span being too short for the large floods of the river, it has been the cause of the destruction of the embankment on the south side at different times.

A close examination was made and an estimate approved for the construction of 26 cubic meters masonry wall and the filling in of the embankment.

The estimate was approved for the amount of \$260.85, and the work was agreed upon with the contractor for the amount of \$260.

The work was performed during the second half of January, 1903.

*Broken stone purchased by contract.*—The metaled part of this section was in such a bad condition that in many places it was as thick as 1 inch; therefore, in order to repair it, 500 cubic meters of broken stone were contracted for, at the rate of \$1.95 per cubic meter; 500 cubic meters of gravel, at the rate of \$1 per cubic meter; and 100 cubic meters of screenings, at the rate of \$0.60 per cubic meter, the total amounting to \$1,535.

Besides this amount, there were expended \$557.04 for hauling and spreading the stone and screenings and sprinkling and rolling the same, making the average cost per cubic meter in place \$2.09.

The addition of all the above amounts make a total of \$2,092.04, and the amount provided for this work was \$2,170.

The work was commenced in the second half of January, 1903, and was completed in April, 1903.

The steam road roller was used for rolling the stone and gave a very good result.

The average number of men employed per day on this section was 7.

*Synopsis of expenses during the year on road No. 3.*

Supervising and laboring force .....	\$3,955.07
Rent of houses .....	0.00
Repairs to bridges and culverts.....	672.00
Incidental expenses .....	2,071.81
Total .....	6,698.88

The amount expended per kilometer was, therefore, \$352.

REPAIRS TO FOUR CULVERTS ON ROAD FROM SAN GERMAN TO SABANA GRANDE.

This section of road from Mayaguez to Yauco is not as yet under maintenance, and should be repaired before long.

Last January orders were received to proceed with the repairs of four culverts which had collapsed.

Wooden floors were placed new on each of them, having used 4,945 linear feet of timber. The work was ordered to be done by day labor, and the total expended amounted to \$319.04.

ROAD NO. 8, SECTION AGUADILLA TO SAN SEBASTIAN.

The present condition of this section is much better than at the beginning of the fiscal year. Two portions of the road were never completed—the one at kilometer 3, nearly 300 meters long, and the one called travesia of Moca, at kilometer 6, 430 meters in length.

In January last orders were received to have these two portions repaired.

Estimates were submitted, the first for the amount of \$413.38 and the other for \$769.56.

Work was started on both places in January, being completed in March, and consisted in repairing the road bed, opening side ditches, and spreading and rolling the stone.

On the first portion only \$382.77 were expended and on the travesia through Moca only \$639.86. Therefore saving was made of \$30.61 on the estimate for the repairs of kilometer 3 and \$129.76 on the travesia through Moca.

This last place has been maintained by the regular force since the repairs were completed.

Besides the work of repairs described above, the camineros, with some auxiliary help, were kept very busy during the rainy season with the removal of landslides and the placing of new macadam.

WORK DONE BY CONTRACT.

Three bridges of this section were in need of paint, and it was approved to expend \$79.05 for painting them, which work was done by contract. Bids were received, and the work was awarded to the lowest bidder for the amount of \$73.

*Purchase of 400 cubic meters of broken stone and 70 cubic meters of screenings.*—The purchase of 400 cubic meters of broken stone and 70 cubic meters of screenings was done by contract, which was awarded to the lowest bidder at the price of \$2.25 per cubic meter of stone and \$1.40 for cubic meter of screenings, making a grand total of \$998. The delivery began in March and was completed in April, 1903. The placing of the stone was done by the regular force, having expended in labor and hire of teams the amount of \$228.06. The average cost of 1 cubic meter in place was \$3.06.

The main needs for this section are two bridges—that is to say, bridge Guatemala and Garcia—which ought to be built as soon as possible. Also 2,000 cubic meters of stone should be purchased at the earliest convenience, and orders should be given to begin the repairs of five culverts, which work is estimated at \$2,600.

*Synopsis of expenses during the year on road No. 8.*

Supervising and laboring force .....	\$5,009.83
House rent.....	96.00
Repairs to bridges and culverts.....	73.00
Incidental expenses .....	1,954.85
Total .....	7,133.68

The average cost of maintaining 1 kilometer was, therefore, \$310.

ROAD NO. 14, SECTION CONSUMO TO LAS MARIAS.

On this section, 9 kilometers long, are employed one capataz and two camineros, men who know thoroughly their duties; otherwise the section would not be so well maintained. Most all the work done this year on this road was done by these three men, with very little assistance of auxiliary labor.

At kilometer 2, at the place called Jardines, the river Cañas washed away the embankment always after a heavy rain, and to avoid this it was necessary to do some kind of work in order to prevent the destruction of the road at that point. A close examination was made, and it was decided to drive two sets of piles along the edge of the embankment and at distances of 1 meter, filling in with large block stone. Also, a spur dike was constructed at about 15 meters up the stream to throw the current to the opposite side. This work was accomplished last February, and so far it has held as expected.

The most costly work on this section is the removal of the land slides; these occur almost every day and keep the regular force very busy. They are careful that the road is never obstructed.

*Synopsis of expenses during the year on road No. 14.*

Supervising and laboring force .....	\$1,678.95
House rent.....	8.00
Repairs to bridges.....	0.00
Incidental expenses .....	260.00
Total .....	1,946.95

The average cost of maintaining 1 kilometer was, therefore, \$216.

EXAMINATION OF ROAD BETWEEN MAYAGUEZ AND CONSUMO.

An order was received last December to examine this road and to prepare and submit an estimate for putting it in a good condition.

Its length was found to be 14 kilometers, and the estimate submitted amounted to \$18,525, not taking into consideration any contingencies or engineering inspection.

As soon as this section of road is finished it will be of great benefit to the city of Mayaguez, as all the coffee planters use this road for transporting their products to the market.

EXAMINATION OF ROAD BETWEEN ROAD NO. 3 AND CABO ROJO.

The order to examine this road was received last January, and after going over it the estimate was submitted for the amount of \$16,597. The total length of the road is 5 kilometers and 740 meters, and it was found to be in an impassable condition, due to the deep mudholes which were formed during the rainy season and not having any macadam.

On April last instruction was given to start work on this road, for which \$12,000 was allotted. The repairs were started on April 13, 1903, and up to June 30 there will have been expended about \$8,050 in repairing 4.7 kilometers. Work is progressing rapidly, and by July 20 the road will be finished.

REPAIRS TO THE LANDING WHARF AT THE PORT OF MAYAGUEZ.

On November last an estimate was requested for doing the necessary repairs to the Mayaguez pier, for the bureau of docks and harbors. An estimate was submitted and approved for the amount of \$1,816, and after it was contracted for, instructions were received for the inspection of the work.

The contractor began work on April 17, 1903, and completed the work on May 15, 1903. The following work was executed by the contractor:

1. The driving of 43 piles of native timber, each 7 meters long.
2. All girders were placed new and five floor beams, each of these consisting of pitch pine, size 8 by 10 inches, and 6,973 linear feet were necessary for this work and 12,735 linear feet of timber, size 3 by 8 inches, were needed for the floor, which was placed all new.

Also 52 cubic meters of broken stone were spread and rammed on the place in front of the wharf.

The final estimate was submitted for the amount of \$1,778.98.

#### REPAIRS TO THE PUBLIC WORKS BUILDING AT MAYAGUEZ.

Last April the public works building occupied by the road supervisor and the captain of the port was repaired and painted. The work consisted in general repairs of the office, doors, wooden partition removed, new windows opened, repairs to the balcony and the roof, painting of the outside and inside, and the installation of an urinal.

The work was done by contract for \$258.

*Expenditures from July 1, 1902, to June 30, 1903, corresponding to pay rolls and vouchers certified by the road supervisor at Mayaguez.*

#### Supervising and laboring force:

Office force .....	\$2, 085. 71
Field force .....	14, 476. 87
Rent of houses .....	152. 00
Repairs to bridges and culverts .....	1, 163. 07
Incidental expenses .....	4, 865. 36
Repairs to the office building .....	258. 00
<hr/>	
Total .....	23, 001. 01
Repairs to the Mayaguez pier .....	1, 778. 98
Repairs to Cabo Rojo road, up to June 30 .....	8, 053. 10
<hr/>	
Grand total .....	33, 633. 09

Respectfully submitted.

R. SKERRETT, *District Engineer.*

#### APPENDIX D.—*Report of the disbursing officer for the fiscal year 1902-3.*

SAN JUAN, P. R., *August 12, 1903.*

SUPERINTENDENT OF PUBLIC WORKS,

*San Juan, P. R.*

SIR: In compliance with your instructions I have the honor to submit herewith a detailed report of the work done in the office of the disbursing officer of the bureau of public works for the fiscal year ending June 30, 1903.

My endeavor has been to make all payments promptly; however, during the year much difficulty was experienced in so doing, owing to the amount of my bond being insufficient to allow of balances large enough to avoid the necessity of frequent requisitions on the treasurer for funds, vouchers frequently having to be held awaiting the receipt of the treasurer's draft, which usually took from five to seven days from date of requisition. This has already been corrected by increasing the bond from \$40,000 to \$50,000, thereby giving opportunity for larger balances.

All payments, except as hereinafter explained, are made by check, made out and signed by the disbursing officer and approved by you.

During the year 5,891 checks were issued.

The accounts are kept in a specially prepared ledger, where each payment is recorded (in numerical order of the check) in one of the several columns, each of which is devoted to a separate appropriation. By means of this it is a simple matter to ascertain at any moment the exact balance in any of these eleven appropriations, as well as furnishing a complete, numerical record of checks. This check record has proven of value, especially in balancing monthly bank statements.

The subheads of these appropriations, numbering 47, are a source of considerable labor, as, within our jurisdiction, they are not transferable, and it is necessary to

carry a balance at all times on each, with the possible exception of "Office force salaries," this being the only appropriation on which a definite estimate can be made. In order to avoid overdrafts in any of these subheads, a card system was inaugurated showing the daily available balances. This prevents balances in bank being overdrawn.

To prevent making requisition for more than the total appropriation an "Appropriation ledger" was kept, showing at all times the balances in the treasury to the credit of this office.

As the accounts were so diversified and originate under such a variety of circumstances, it was deemed best to keep an individual account with all persons doing business with the bureau, by means of which we have a complete record of the total amount paid to any person or firm for the past year. This record is of exceeding value as a means of reference, and is in constant use.

Pay rolls are paid twice a month in cash. When received, each complete pay roll is entered in the individual ledger under the official account of the disbursing officer, the amounts checked and the distribution of the money made and attached thereto, and the envelopes written. On each envelope appears the laborer's name, his pay roll number, and the amount due him. Checks are then drawn for the several amounts to the order of the disbursing officer.

The distribution sheets are then combined and the total number of bills and coins necessary of each denomination ascertained, and the money is so drawn from the bank. It is counted by the bank teller and recounted in this office. Each pay roll is handled separately, the envelopes and the individual distribution sheet for the same being attached thereto. The correct amount for each pay roll, in proper denominations, is counted out by me; another clerk counts it from that total to the individual envelopes, and a third counts it and places it in the envelopes. There must be no excess or deficiency either in putting up any roll or after the completion of all of them. Each step in the process proves itself, and it would seem that no error could occur; in fact, in two years there has been none, which is sufficient evidence of the reliability of the system.

During the past year there was prepared, in the above manner, 42,425 envelopes, containing \$185,205.37, or an average of \$4.36 per envelope. This means 3,535 envelopes per month, each of which requires as much or more preparation than the issuance of a check. If checks had been used in place of this system there would have been a total of 50,000. There are, however, many good reasons to continue the system, one of which is the inability of the laborer to secure full cash value of his check.

After the individual envelopes have been sealed they are wrapped in packages, tied, sealed, and sent through the post-office by registered mail to their proper destination, each package being insured for the amount of its contents by the local agents of an insurance company. The envelopes are distributed by the overseer in charge of the work, who is responsible for their safe delivery.

Accompanying this report is an itemized statement of disbursements both for the regular budget and the trust fund, showing a disbursement during the year of \$711,648.18, accounted for by 6,691 vouchers.

To the fidelity and intelligence of the three clerks comprising the office force at my disposal is largely due the satisfactory results obtained in the past year, and I take extreme pleasure in being able to say so.

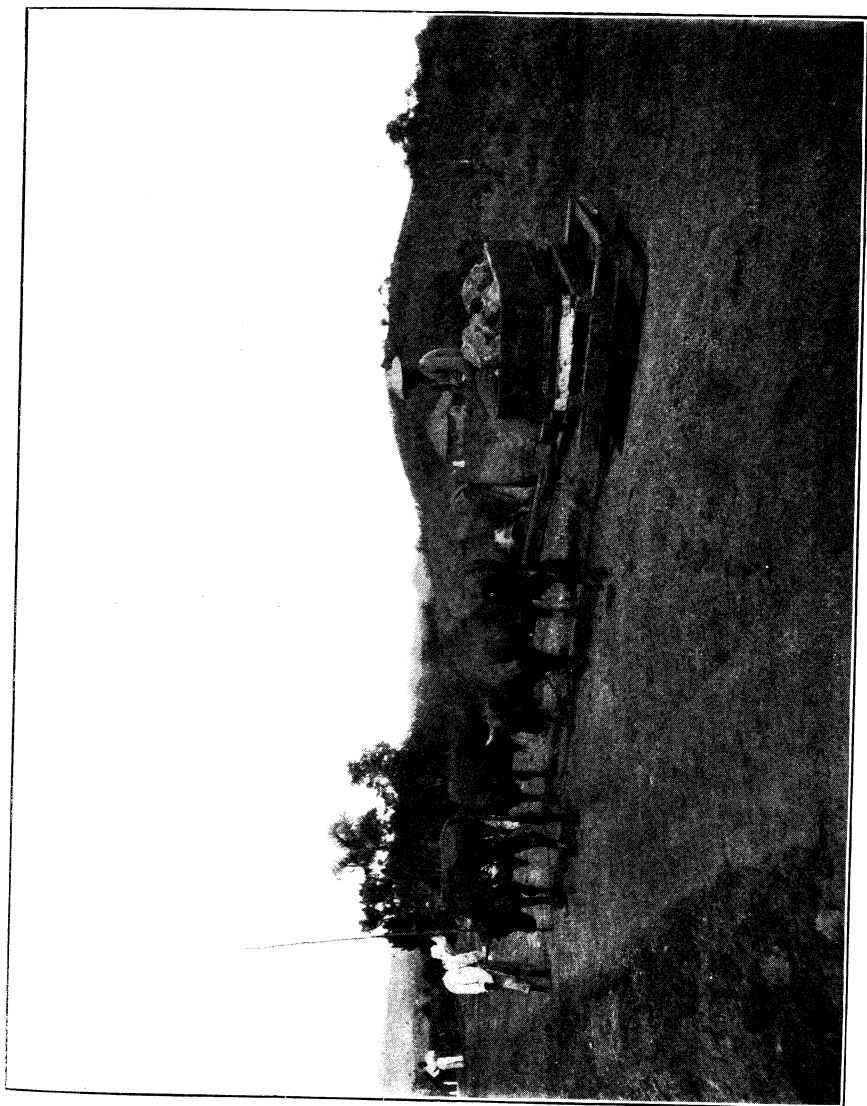
Very respectfully,

W. C. SMITH,  
*Disbursing Officer.*

Monthly statement of disbursements on account of budget during fiscal year ending June 30, 1903.

	Salaries.		1									
			CONTINGENT EXPENSES.									
			Office supplies.		Inspection and travel.		Purchase and repair drawing instruments.		Surveying harbor lands.		Care and preservation harbor works.	
	No. of vouchers.	Amount.	No. of vouchers.	Amount.	No. of vouchers.	Amount.	No. of vouchers.	Amount.	No. of vouchers.	Amount.	No. of vouchers.	Amount.
1902.												
July.....	89	\$7,551.04	1	\$1.75	11	\$209.12	2	\$10.81	2	\$57.10	1	\$30.00
August.....	164	15,340.66	7	50.66	21	501.64	2	53.81	3	53.81	1	30.00
September...	103	10,782.12	6	43.88	7	124.57	1	306.32	3	181.98	2	32.30
October.....	138	16,513.27	14	78.19	11	274.33	1	.65	2	100.04	2	32.40
November.....	125	9,782.91	6	40.36	9	184.20	2	115.87	2	70.11	1	3.50
December....	162	18,596.72	7	22.35	16	277.15			2	41.62	2	60.00
1903.												
January.....	102	8,479.05	9	20.81	11	155.09			2	53.62	1	.70
February.....	146	13,693.54	9	28.95	7	125.47			5	146.13	2	60.00
March.....	145	13,696.94	10	29.98	6	83.33			4	70.28	3	33.80
April.....	166	18,704.25	11	42.19	8	241.59	2	4.10	5	179.45	3	32.10
May.....	119	11,355.54	9	38.84	12	308.22	2	4.54	11	1,075.74	1	14.52
June.....	249	24,314.26	20	161.27	18	509.16	3	47.59	10	214.70	6	54.96
Total..	1,708	169,196.14	109	559.23	137	2,993.87	13	489.88	51	2,244.58	25	384.28

	2								3							
	MAINTENANCE OF ROADS.								MAINTENANCE PUBLIC BUILDINGS.							
	Rent of tool sheds.		Repairs to bridges and culverts.		Materials, tools, and incidental expenses.		Construction of culvert, Caguas-Humacao.		Preservation and care, etc.		Water.		Electric light.			
	No. of vouchers.	Amount.	No. of vouchers.	Amount.	No. of vouchers.	Amount.	No. of vouchers.	Amount.	No. of vouchers.	Amount.	No. of vouchers.	Amount.	No. of vouchers.	Amount.		
1902.																
July.....	24	\$94.00	24	\$581.42	2	\$1,800.00			20	\$369.74						
August.....	28	107.50	17	554.22	37	4,257.04			55	2,324.19			3		\$311.58	
September...	28	107.50	17	554.22	37	3,143.66			48	1,288.54			2		312.67	
October.....	26	100.50	10	1,209.04	45	9,545.46			74	3,249.12			2		341.07	
November.....	27	103.50	4	200.52	68	4,368.13			61	2,820.07			2		427.70	
December....	29	115.50	11	437.11	67	4,058.36			66	2,309.46			2		433.89	
1903.																
January.....	25	91.50	12	1,896.65	51	3,874.16			64	2,590.37			2		523.36	
February.....	27	103.50	12	1,754.84	74	3,601.20			81	2,785.15						
March.....	27	103.50	19	913.50	100	12,587.02			71	4,073.70			1		148.16	
April.....	27	101.50	6	93.06	89	9,018.68			55	1,607.67			5		1,557.01	
May.....	28	103.50	7	478.82	93	12,596.22			25	1,627.26			2		417.52	
June.....	49	175.00	16	1,388.61	128	9,636.06	4	\$1,471.36	75	2,006.62			4		695.45	
Total..	317	1,199.50	138	9,507.79	823	78,485.99	4	1,471.36	695	27,651.89			25		5,168.41	



OLD-FASHIONED ROAD ROLLER, BAYAMON-COMERIO ROAD.





Monthly statement of disbursements on account of budget during fiscal year ending June 30, 1903—Continued.

	4		5		6		7		8		9		Total.
	Permanent repairs insane asy- lum.		Expenses executive mansion.		Permanent repairs ex- ecutive man- sion.		Survey pub- lic lands.		Convict la- bor, inci- dental ex- penses, Humacao- Yabucoa.		Engineer- ing and superin- tendence, Humacao- Yabucoa.		
	No. of vouchers.	Amount.	No. of vouchers.	Amount.	No. of vouchers.	Amount.	No. of vouchers.	Amount.	No. of vouchers.	Amount.	No. of vouchers.	Amount.	
1902.													
July .....			2	\$366.63	2	\$140.62							\$10,526.00
August .....			14	366.53	14	1,833.09							26,141.27
September .....			7	312.28	14	377.07							17,567.11
October .....			8	461.70	23	1,989.46							33,895.23
November .....			36	1,384.36	7	496.60							19,997.83
December .....			24	942.24	3	654.34							27,948.74
1903.													
January .....			28	1,913.76	1	196.05							19,795.12
February .....			16	1,297.22									23,596.00
March .....			16	699.68									33,039.89
April .....			14	618.39									32,199.99
May .....			23	757.77									29,160.21
June .....	15	\$713.12	32	1,292.93			9	\$520.88	1	\$20.20	1	\$39.56	42,880.01
Total ..	15	713.12	220	10,413.49	64	5,687.23	9	520.88	1	20.20	1	39.56	316,647.40

Disbursed by auditor account water for public buildings .....	\$13,406.52
Outstanding liabilities .....	7,915.03
	21,321.55
Less partial payment made on stone contract in April and credited on May vouchers .....	262.50
	21,059.05

Monthly disbursements on account of trust fund from July 1, 1902, to June 30, 1903.

	Construction, Defendini kilometer 15.		Construction, Arecibo-Bacupey, lot No. 4.		Construction, Adjuntas-Utuado.		Survey Adjuntas-Utuado.		Construction, Arecibo-Ponce.		Construction, San Sebastian-Lares.	
	No. of vouchers.	Amount.	No. of vouchers.	Amount.	No. of vouchers.	Amount.	No. of vouchers.	Amount.	No. of vouchers.	Amount.	No. of vouchers.	Amount.
1902.												
July .....	4	\$783.23			2	\$584.56	2	\$567.00			2	\$454.40
August .....	6	5,268.70			6	8,092.84	5	146.60			10	2,225.88
September .....	6	5,908.32			9	6,792.64	3	520.00			9	6,645.00
October .....	7	6,639.32			9	1,482.93	1	496.20			6	149.79
November .....	2	6,690.08			8	7,216.08	2	522.40			5	4,999.24
December .....	4	4,864.14			6	1,087.75	5	856.60			7	3,597.08
1903.												
January .....	3	3,233.63			7	13,739.41					5	4,153.33
February .....	5	2,704.33	1	\$540.00	6	494.91					5	746.79
March .....					7	7,601.78					5	724.37
April .....	3	155.39			6	4,541.04					5	719.40
May .....	5	490.75	2	639.30	1	4.90			5	\$580.44	6	22,842.71
June .....	5	8,068.35							11	1,712.03	9	1,231.00
Total ..	50	44,806.24	3	1,179.30	67	51,638.84	18	3,108.80	16	2,292.47	74	48,438.99

Monthly disbursements on account of trust fund from July 1, 1902, to June 30, 1903—  
Continued.

	Survey, San Sebastian-Lares.		Construction, Yauco-Sabana Grande.		Survey, Yauco-Sabana Grande.		Bridge over Mavilla River.		Bridge over Portugues River.		Yabucoa-Maunabo.	
	No. of vouchers.	Amount.	No. of vouchers.	Amount.	No. of vouchers.	Amount.	No. of vouchers.	Amount.	No. of vouchers.	Amount.	No. of vouchers.	Amount.
1902.												
July.....	1	\$150.00	5	\$399.11	1		1	\$594.36			2	\$447.70
August.....			7	406.28			1	420.67			14	5,872.34
September ..	1	37.17	6	1,629.57							7	4,040.64
October.....	1	9.46	5	2,656.45							7	3,753.64
November ..			12	762.66	1	\$21.61					6	3,771.04
December....											8	3,074.30
1903.												
January.....			25	3,402.91							4	3,135.38
February....			34	3,031.11			6	1,239.94			6	1,992.33
March.....			71	5,775.88					1	\$100.00	5	1,151.68
April.....			67	6,389.34							7	725.85
May.....			94	10,334.98			1	10.47	3	16.80	7	1,660.24
June.....			87	11,830.12					3	40.40	11	1,643.81
Total..	3	196.63	413	46,618.41	1	21.61	9	2,265.44	7	157.20	84	31,268.95

	Caguas-Hu-macao.		Right of way, damages.		Completion of wall, Cariaco.		Camuy-Agua-dilla.		Ponce-Gua-yama.		Mameyes-Fajardo.	
	No. of vouchers.	Amount.	No. of vouchers.	Amount.	No. of vouchers.	Amount.	No. of vouchers.	Amount.	No. of vouchers.	Amount.	No. of vouchers.	Amount.
1902.												
July.....	5	\$4,582.62										
August.....	1	8.22	33	\$2,637.89	2	\$13,394.52						
September ..					1	3,770.96						
October.....					1	215.82	1	\$130.43	1	\$1.00	5	\$353.67
November ..												
December....												
1903.												
January.....							46	1,826.56	16	670.77	38	1,585.14
February....							72	3,682.08	16	1,593.50	49	4,011.80
March.....					1	25.70	86	4,507.46	38	2,881.43	52	3,422.42
April.....							88	4,644.43	50	4,646.16	75	4,549.35
May.....							91	4,634.93	48	4,275.49	80	5,097.74
June.....							133	6,042.99	80	6,426.79	90	6,201.97
Total..	6	4,590.84	33	2,637.89	5	17,407.00	517	25,198.88	249	20,495.14	389	25,222.09

Monthly disbursements on account of trust fund from July 1, 1902, to June 30, 1903—  
Continued.

	Fajardo-Naguabo Playa.		Mayaguez-Cabo Rojo.		Naguabo-Naguabo Playa.		Manati-Ciales, lot No. 2.		Construction, Bayamon-Comerio.		Survey, Comerio-Bayamon.	
	No. of vouchers.	Amount.	No. of vouchers.	Amount.	No. of vouchers.	Amount.	No. of vouchers.	Amount.	No. of vouchers.	Amount.	No. of vouchers.	Amount.
1902.												
July.....	11	\$830.15									2	\$330.00
August.....	39	919.67									1	74.20
September....	1	9.44									8	518.59
October.....											8	697.38
November....	1	.40							1	\$35.00	4	396.51
December.....							2	\$36.30	7	553.20	5	694.10
1903.												
January.....							2	33.48	9	444.49		
February....	18	683.03					13	479.71	11	1,750.75		
March.....	20	878.60					8	964.95	14	1,294.74		
April.....	7	115.12	5	\$255.45			3	91.64	11	18,256.41		
May.....			51	4,479.06			4	136.40	9	9,746.71		
June.....			51	5,262.03	19	\$1,320.23	7	1,663.73	11	11,135.05		
Total..	97	3,436.41	107	9,996.54	19	1,320.23	39	3,406.21	73	43,216.35	28	2,710.78

	Survey, Barros to Corozal.		Survey, Barranquitas-Barros.		Survey, Jayuya-Adjuntas.		Vega Alta road.		Añasco River bridge.		Total.
	No. of vouchers.	Amount.	No. of vouchers.	Amount.	No. of vouchers.	Amount.	No. of vouchers.	Amount.	No. of vouchers.	Amount.	
1902.											
July.....	1	\$390.00			1	\$375.00					\$5,506.40
August.....	2	125.00			1	288.00					28,415.87
September....	2	477.40			1	58.80					41,417.74
October.....	1	242.60	1	\$119.30							15,372.58
November....	2	284.80	1	132.20	2	124.68					30,484.62
December....	3	309.51	1	18.50							16,526.67
1903.											
January.....											32,225.10
February....											22,950.28
March.....											29,329.01
April.....											45,089.58
May.....											64,680.92
June.....							7	\$289.16	3	\$34.35	62,902.01
Total..	11	1,829.55	3	270.00	5	846.48	7	289.16	3	34.35	394,900.78

APPENDIX E.—Annual report of works executed in the section of public buildings during fiscal year 1902-3.

SAN JUAN, P. R., August 14, 1903.

MR. A. STIERLE,

Superintendent of Public Works, San Juan, P. R.

SIR: I have the honor to submit for your consideration the following report of work executed and carried on by the section of public buildings during the fiscal year ending June 30, 1903.

#### EXECUTIVE MANSION.

The painting of entire exterior of this building, as reported being carried on in last annual report, has been finished; also, the following interior painting and decorating was done:

The governor's private office, public reception room, parlor or reception room,

music room, and tea room have been painted in lead and oil and decorated in an artistic manner becoming to such rooms in a governor's mansion.

The walls around main stairway entrance were cleaned and scraped of old lime wash; plaster repaired and floated down to a smooth surface, and then walls painted with cold-water paint. The dome above stairway was repainted. The old Spanish shields were retouched and restored to their original state.

The clerk's office in front of stairway landing on second floor, all halls and corridors throughout the building, the pantry, kitchen, and cook's room have been scraped of old limewash and repainted with cold-water paint, all woodwork throughout being varnished or painted in lead and oil. All rooms and corridors in basement under secretary's office rewashed with lime, and woodwork painted one coat. Also, all interior walls in laundry and stables rewashed with lime.

The two private rooms occupied by the chief of police were painted three coats lead and oil paint.

Several floor beams under the breakfast room were found to be decayed on their ends, and were repaired by setting in hard-wood corbels under end of each beam. Also tile floor in breakfast room repaired.

One new toilet room was partitioned off from a large bedchamber on third floor, and a bath tub, water-closet, and wash basin placed therein.

The two large open arches in outside wall of kitchen were closed up with rolling slat-blind shutters. One large sink changed from kitchen to butler's pantry. The two large refrigerators repaired and put in good condition. Galvanized gutters and downspouts of entire building repaired. Two new water-closets were placed in toilet room used by the insular police. A new marble tile floor has been laid in billiard room. Ordinary minor repairs have been made to the plumbing, electric-light and call-bell system during the year.

The following work has been done under my supervision in that part of the building occupied by the secretary, but paid with funds of the secretary's office:

In the main clerk's office an old brick partition was taken out and the marble tile floor extended through the entire room; a new skylight also placed over this office. The location of the stairway to second-story part was changed, and new stairs built.

New metal shelving placed in fire-proof vault, three pairs swing doors put up, and most all rooms occupied by the secretary's employees repainted.

New wooden shelving was built in file room; also three new awnings placed over outside windows.

Changed location of and extended 150 feet of water pipe, general repairs to faucets, and placed one new water meter at the summer palace at Rio Piedras.

The general condition of executive mansion is now good and will not, in my opinion, require any important repairs for several years.

Total expenditure during fiscal year from "Maintenance and repair of executive mansion," \$10,413.49.

Total expenditure during fiscal year from "Permanent repairs of executive mansion," \$5,687.23.

#### INSANE ASYLUM, ALSO CALLED BENEFICENCIA.

The old kitchen used by the superintendent of this institution, being in a very unsafe and dilapidated condition, has been torn down, and a new and commodious kitchen, laundry, storeroom, bathroom, and servants' room erected in the same location. This building adjoins the rear wall of the central part of building and is constructed on second floor, being built on top of an extension of the roof over first floor, the old brick roof forming the floor.

The addition is well and strongly built with framework, sheeted on outside with siding, and roofed with galvanized corrugated iron. Cement tiles were laid on floor in kitchen, bath, and toilet. The plumbing consists of one iron enameled bath tub, shower, two modern water-closets, one kitchen sink, one slop sink, and two laundry tubs.

Many bad leaks have occurred in the roof of this institution during the past year, but all such places have been thoroughly repaired, and at present the entire roof is in good condition.

A new wood floor was laid in the infirmary of women's department.

New brass padlocks were placed on all cell doors.

The arch over old brick sewer, where it passes out of the building under main exterior wall, was found to be giving way and wall above becoming badly cracked. A new masonry arch was at once constructed, the sewer repaired, and the large manhole just outside of wall rebuilt. Considerable repairs have been made to broken plaster and cornices about the building. Also the large hole in the rear wall, caused by a shell during the bombardment of San Juan, was filled up and repaired.

Wood posts and girders were put up in one room in basement of old shop destroyed by fire four years ago. The roof beams were becoming unsafe, and these beams were necessary for their support.

Considerable repairs have been made to electric-light system throughout the building and minor repairs made to plumbing system during the year.

On the 21st of May, 1903, a contract was entered into for the installation of an entire new sanitary plumbing system in both men's and women's departments of the institution, as I had always contended the old system of range closets and urinals have proved to be unsatisfactory and unsanitary in an institution of this kind. The following bids had been received:

*Abstract of bids for installing a plumbing system at the insane asylum.*

No. 1. H. Kaplan, San Juan, three months .....	\$6,500.00
No. 2. John E. Gordon, San Juan, three months .....	4,973.55

The contract was awarded to John E. Gordon.

The new system provides in a general way for the following fixtures:

In men's department there are 4 toilet rooms, and in each of these will be placed 5 heavy iron enameled roll-rim water-closets, each provided with a separated flush tank and one slate urinal with iron enameled gutters and automatic tanks (flush); also in two of these toilet rooms will be placed one iron enameled bath tub and one large iron enameled slop sink. The wash basins now in use are in good condition and do not require changing.

In the central part of men's department in old chapel will be installed the shower-bath room, composed of 2 slate shower ranges of 4 stalls each; also one combination needle shower, inclosed in masonry work with door, so that violent patients may be placed inside and the water turned on from the outside.

In women's department 2 toilet rooms and 2 bathrooms will be installed complete, including in each toilet room 4 water-closets and 1 slop sink. Each bathroom will have 1 shower range of 4 stalls, 1 bath tub, 1 combination needle shower bath and 3 wash basins. All fixtures will be same kind and quality as in men's department.

In women's department, next to kitchen, will be installed the main laundry, composed of 15 heavy iron enameled, roll-rim laundry tubs. In separate locations will also be installed two small laundries of 3 tubs each, one for washing employees' clothes and one for contagious diseases.

In the kitchen will be installed one large iron enameled kitchen sink and one slop sink. A 120-gallon hot-water boiler will be installed, connected to range, and will supply hot water to kitchen sinks and all laundry tubs.

An entire new sewer system of extra heavy cast-iron pipe has been laid in both men's and women's departments. In men's department the new sewer connects with the military sewer at same point as heretofore. In women's department the new sewer goes through main courtyard and connects with the old brick sewer outside of wall. This brick sewer is about 4 feet in diameter and carries sewage into bay below.

All cast-iron sewer pipes, stacks, and fittings, also all brass fittings of every description to be used in this work, are to be extra heavy.

All cell drains and floor drains in all rooms where any plumbing is to be placed will be trapped and connected to sewer.

The new plumbing system and work in connection with same will be paid from appropriation "Permanent repairs insane asylum."

There has been expended of this fund up to June 30, 1903, \$1,109.10.

From regular appropriation "Maintenance and repair to public buildings" there has been expended \$1,014.19.

INTENDENCIA.

This building has been painted three coats lead and oil on exterior facing the plaza and San Francisco street, and including the walls of the courtyard.

The private offices of the treasurer and commissioner of the interior were painted three coats lead and oil.

Repaired flooring, doors, shutters, etc., and calcimined walls in offices occupied by bureau of agriculture and mines.

Removed old shelving and calcimined walls of principal clerk's office of treasurer department.

New steel shelving installed in treasurer's and auditor's fireproof vaults.

One new toilet room of three water-closets built for use of treasurer's office.

Minor repairs made to plumbing work throughout the building and same kept in proper condition.

New shelving built throughout for section of archives.

New skylight built over one office room of commissioner of the interior.

Built new stairway in rear part of courtyard.

Built new wooden partition, changed location of several doors and shutters, removed old library shelving, repaired floors, whitewashed walls and ceilings of three office rooms in department of education.

Built new shelving, repaired walls and roof, whitewashed and painted two rooms on ground floor for new library of department of education.

Repaired broken plaster of ceiling in auditor's office.

#### FORTALEZA NO. 3, PINK PALACE.

Built new balconies on second floor in rear of secretary's residence, new concrete walks laid in garden, and garden fence and walks repaired and put in good condition.

Built new brick range in kitchen; put in new drainpipe for sink in kitchen.

Installed fifteen new electric lights in main parlor; one new light in street entrance.

Built new fountain in courtyard. Repaired broken plaster, doors, and shutters of entire exterior of building, and painted in lead and oil the north front, west side, and courtyard. Main staircase hall was calcimined and kitchen whitewashed. General repairs made to plumbing and electric-light system.

#### FORTALEZA NO. 2, PAVILLONES.

*Section No. 1.*—Constructed new cast-iron sewer connection for surface water in courtyard, laid new tile floor in bathroom, calcimined one bedchamber, repaired stairs to roof in courtyard, built new china closet in dining room.

*Section No. 2.*—Installed new slop sink in small rear courtyard, calcimined parlor and two bedchambers, made general repairs to doors and shutters.

*Section No. 3.*—Removed all old floor drains and trap and placed new fittings. Repaired tile floor in halls and one new door between kitchen and dining room. Installed five new lights, repaired light wires, and run new wire throughout for call bells. Repaired roof over bathroom.

Recalcimined interior of all rooms and courtyard. Put up new rolling blinds or curtains on front porch.

Made general repairs to doors, shutters, and plumbing work throughout entire three buildings.

New grass lawn laid in front of buildings on Fortaleza street. Exterior of all painted in lead and oil.

#### PABELLON DE SAN JUAN.

A new brick addition, including kitchen, pantry, storeroom, etc., on ground floor. and dining room and two bedchambers on second floor, has been built. The old part of building has been thoroughly repaired, calcimined inside, all woodwork painted, and the entire exterior painted in lead and oil.

General repairs made to plumbing and electric-light system.

#### FORTALEZA NO. 5.

Built new wood partitions, laid new wooden floors, repaired doors and shutters, and calcimined and painted offices occupied by board of health.

Built new toilet room of one water-closet and one sink for use of Federal court. Made porch wider and laid tile floor on same for entrance to court, new partition for jury room, platform and back screen for judge's stand, put up railing in front of bar in Federal court, and repaired roof and skylight over court room.

Front on Fortaleza street and entrance hall on ground floor was painted in lead and oil.

General repairs made to plumbing and electric light systems.

#### RED HOUSE.

General repairs have been made throughout this building, including new balustrade and floor on main front porch, all doors and shutters repaired, and outside shutters altered so as to open on outside. All old hardware replaced with solid brass; one new partition built for a passage to rear porch; one pair new doors placed on rear porch; glass put in china-closet doors; leaks in roof repaired; small shed built for storage of wood; water-closet placed in rear part for servants; water pipe extended to yard; front fence moved out toward road and a division fence built for a grass plot; new cement steps built to front porch and new cement walk built from front gate to porch steps.

Entire interior and exterior of the building painted in lead and oil.

Plumbing and light systems kept in repair.

## DIPUTACION.

Built new brick addition to printing office on first floor and frame addition to house of delegates on second floor; laid concrete and cement floor in entire printing office; new shelves and racks built for papers, changed location of wash basin, and installed large wooden zinc-lined sink, connected to sewer, and installed twenty electric lights in printing office. Repaired skylights over house of delegates; white-washed walls and painted woodwork in second-floor corridor in west end of building; built three new blind partitions inside of new addition to house of delegates; also painted one clerk's office.

Put up three new awnings on west end of executive council office. Installed one marble-top wash basin in attorney-general's office.

Built three tables for instruments in telegraph school, one large case for papers, and one pigeonhole case for desk in insular telegraph office. Five electric lights were placed in telegraph school. Slight repairs made to doors and shutters in general and plumbing and light systems kept in a proper condition.

## AUDIENCIA.

On first floor, northwest corner, the proper alterations and repairs were made for new court and jury room for jury trials. The walls were plastered, one new opening cut into courtyard, new wood floor laid in jury room, also about one-half of main court room was refloored. Platform was built for judges' stand, wood balustrade built across for bar rail, new outside shutters put in, and all walls and ceilings calcimined and woodwork painted. Built new wood partition around stair landing on second floor.

A complete new call-bell system has been installed throughout the supreme court offices, slight repairs made to roof, and the main sewer pipe from building has been taken up twice and cleaned on account of being obstructed with refuse matter.

## BOYS' CHARITY SCHOOL.

Built new brick flue for kitchen, and connected up to ranges. One new sink placed in kitchen and one in principal dining room. Toilet room used by the infirmary rearranged, and installed bath tub and water-closet; also rearranged plumbing fixtures in toilet rooms used by teachers on second floor and constructed new wood partitions around same. Put in one water-closet in laundry; electric wire was run to stable and three lights placed; also placed fourteen new lights in main building. Wires repaired in general, and laid new tile floor in teachers' dining room.

This building has been thoroughly overhauled and repaired; doors and shutters were repaired, several openings being made new; corner boards made for all corners around corridors; plaster repaired throughout, and the entire building painted outside and in courtyard in lead and oil; also large dormitory and schoolroom on south side was calcimined; wood floors throughout repaired; plumbing and light systems kept in repair.

## GIRLS' CHARITY SCHOOL.

This building has also been thoroughly repaired. The exterior walls of north addition were plastered; broken plaster in other parts repaired, and the entire exterior and courtyard painted in lead and oil. A new wooden floor was laid around entire corridor on ground floor; also wooden floors throughout were repaired and several floor beams of the corridor floors were replaced by new ones. A small piece of plaster ceiling in kindergarten schoolroom was removed and ceiled with wood, and new cement floor was laid in general toilet room on first floor. Built new wooden partitions on second floor at southwest corner in order to make proper sleeping rooms for teachers; cut new doorway through brick wall to make entrance to these quarters; installed nine new electric lights, and kept in repair the plumbing and light systems.

## PENITENTIARY.

Changed location of one water meter; extended water supply to the laundry; light system kept in repair.

## POLICE BARRACKS AND TELEGRAPH OFFICE AT CAGUAS.

This building has been thoroughly repaired and put in good condition; new wooden floor laid throughout on ground floor; new floor in telegraph office and other parts of floors repaired; new doors made for front balcony and all other doors and shutters repaired. About one half of old tile roof was removed and made new, plastering throughout repaired, and the entire front and second-floor frame work, walls, telegraph office, and all doors and shutters painted in lead and oil; all other parts white-

washed. New partitions built on ground floor to make proper provisions for police quarters; cesspool cleaned.

TELEGRAPH BUILDING, HUMACAO.

This building was never entirely finished when built, but has now been completed by placing railing on front porch and finishing woodwork of ceiling and repairing shutters and doors. Painted all the exterior and interior surfaces in lead and oil.

PUBLIC WORKS BUILDING, MAYAGUEZ.

Made general repairs to doors and shutters, laid concrete floor in stair entrance, painted exterior in lead and oil, and whitewashed interior.

POLICE BARRACKS AND TELEGRAPH OFFICE, ARECIBO.

This building was closed by the board of health on account of unsanitary conditions. The doors and shutters were closed and some had to be nailed up from inside. No funds are yet available for repairs to this building.

PUBLIC WORKS BUILDING, PONCE.

Small addition built for toilet room and one water-closet installed for telegraph offices; slight repairs made to doors.

CONTINGENT EXPENSES.

From this fund there has been purchased one new wagon, set of double harness, set of single harness, two horses, one barrel of wood preserver, and flags for public buildings. The salary of one timekeeper and the expenses for wagon and other repairs, horseshoeing, general supplies, and feed for stables have also been paid for from this fund.

Respectfully submitted.

GUY S. BOYCE,  
*Supervisor of Public Buildings.*

APPENDIX F.—*Report of the assistant superintendent, on franchises, etc., for the fiscal year 1902-3.*

SAN JUAN, P. R., July 1, 1903.

Mr. A. STIERLE,

*Superintendent of Public Works, San Juan, P. R.*

SIR: I have the honor to submit herewith a list of franchises granted by the executive council during the fiscal year 1902-3, notified to the bureau of public works, and of the plans examined in connection thereof; also a list of the projects examined for the recommendation of the governor for municipal works to be constructed with the funds proceeding from city loans, and a list of permits for crossing public roads and for other uses of the public domain, as follows:

FRANCHISES.

No. 1. Ordinance of the executive council, dated December 2, 1902. Grantee: J. D. H. Luce, his heirs, etc.

The right to construct and operate a landing pier or wharf on the east side of the harbor of Ponce and on the shores thereof, and for other purposes.

Copy was sent to the bureau of public works December 13, 1902.

No plans of the pier therewith have been examined in this bureau.

No. 2. Ordinance of the executive council, dated December 2, 1902. Grantee: Justo Barros.

The right to construct a wooden bridge over the river Jacaguas for the transportation of cane.

Copy of this franchise sent to the bureau of public works December 13, 1902.

The plans for the construction have not been submitted.

No. 3. Ordinance of the executive council, dated December 2, 1902. Grantee: The municipality of Guayama.

The right to construct a telephone line between Guayama and Arroyo and to operate the same for public purposes.

Copy was sent to the bureau of public works December 18, 1902.

No notice that the line has been established.

No. 4. Ordinance of the executive council, dated December 3, 1902. Grantee: Benjamin J. Horton.

The right to construct, operate, and maintain a system of long-distance telephone lines extending through the island of Porto Rico and connecting various cities and towns thereof, together with local telephone exchanges in such cities and towns.



Copy of the franchise was sent to the bureau of public works December 4, 1902.

No notice has reached this bureau that any work has ever been done under that franchise.

No. 5. Ordinance of the executive council, dated March 5, 1903. Grantee: Municipality of Coamo.

The right to take from the Coamo River 6 liters of water per second for the purpose of supplying the inhabitants of the municipality with water.

Copy of the franchise sent to the bureau of public works March 10, 1902.

The plans and project prepared in the year 1882 were submitted by the grantee at the time of asking for the franchise.

No. 6. Ordinance of the executive council, dated March 2, 1903. Grantee: The Vandergrift Construction Company.

The right to build and operate a line of railway between the municipality of San Juan and the Playa de Ponce in the island of Porto Rico, and to develop electric energy by water or other power for distribution and sale for railway, lighting, and industrial purposes.

Copy of the franchise sent to the bureau of public works March 10, 1903.

No plans submitted yet.

No. 7. Ordinance of the executive council, dated May 19, 1903. Grantee: The American Railroad Company of Porto Rico. A revocable permit to construct a branch track into the town of Aguadilla and to cross and use certain portions of certain public highways in and near the town of Aguadilla.

Copy of this franchise was not sent to the bureau of public works.

No. 8. Ordinance of the executive council, dated May —, 1903. Grantee: The San Juan Light and Transit Company. A revocable permit to continue the maintenance and use of a side track in front of the Boys' Charity School in Santurce, and to construct, maintain, and use a side track or switch in front of the property known as the Girls' Charity School in Santurce, and to construct and use tracks across, alongside of, or upon the military road in order to connect each end of said switch with the main line.

Copy sent to the bureau of public works June 29, 1903.

Under franchises granted in the present and in previous years plans have been submitted and approved as follows:

*June 30, 1902.*—The American Railroad Company of Porto Rico. Plans for building a wooden wharf at San Juan Harbor along the water frontage of the land leased to the company.

*September 11, 1902.*—The American Railroad Company of Porto Rico; Central Aguirre, operator. Plans of the line between Ponce and Guayama.

*September 12, 1902.*—American Railroad Company of Porto Rico. Plans for a portion of the line between Mayaguez and Ponce, from Yauco to Hacienda Limon; length, 11.495 kilometers.

*September 16, 1902.*—American Railroad Company of Porto Rico; Central Aguirre, operator. Plans for a timber bridge over the Coamo River were not approved.

*October 31, 1902.*—Juan Cortada; plans and project for a petition of franchise to use 75 liters per second of the waters of Mejia stream for irrigation of lands.

*November 6, 1902.*—Ponce Railway and Light Company; assigns of H. Lothrop. Plans for the general wiring for incandescent and arc lights for Ponce city and Playa town.

*November 22, 1902.*—American Railroad Company of Porto Rico. Plans for the crossing of the main road with the track of the branch line from Ponce to Playa.

*November 22, 1902.*—American Railroad Company of Porto Rico; Central Aguirre, operator. Plans of a portion of the line between Hacienda Palmira and Guayama.

*December 5, 1902.*—Juan Cabezas. Plans to build a low timber bridge over the Loiza River for hauling sugar cane.

*December 10, 1902.*—American Railroad Company of Porto Rico; Central Aguirre, operator. Plans for a timber bridge over the Coamo River.

*January 20, 1903.*—American Railroad Company of Porto Rico. Plans to obtain the consent of the executive council for the extension of a railway line to Mayaguez Playa and to Aguadilla beach.

*January 27, 1903.*—Municipality of Coamo. Plans and project of waterworks for supplying the city of Coamo with 6 liters of water per second from the Coamo River.

*January 29, 1903.*—American Railroad Company of Porto Rico. Plans for a portion of 3½ kilometers of railway line between San German and Lajas.

*March 13, 1903.*—American Railroad Company of Porto Rico. Plans for the extension of the railroad tracks on the lands leased to the company at San Juan. Conditions recommended for laying and maintaining the tracks therein.

*May —, 1903.*—Vicente Usera. Plans for dam at River Jueyes for using some of its waters for irrigation of lands.

*June 2, 1903.*—American Railroad Company of Porto Rico. Plans of two portions

of railway of the line Mayaguez to Yauco. One portion is 5.198 kilometers long and the other 12.952, and completes the whole line from Mayaguez to Yauco.

*June 20, 1903.*—American Railroad Company of Porto Rico. Plans of the branch track through the town of Aguadilla to a station at the Playa. Plans of the station at the Playa.

*June 30, 1903.*—San Juan Light and Transit Company. Plans for a switch or turn-out in front of the Girls' Charity School at Santurce.

#### EXAMINATION OF PLANS FOR MUNICIPAL WORKS CONSTRUCTED WITH FUNDS FROM LOANS.

*June 26, 1902.*—City of Humacao. Project of waterworks to supply the city of Humacao with 17 liters of water per second.

*August 19, 1902.*—City of San Juan. Plans and project for the sewerage system of the city of San Juan.

*September 22, 1902.*—City of Mayaguez. Plans and project for the sewerage system of the city of Mayaguez.

*October 4, 1902.*—City of San Juan. Plans and project for the paving of a number of streets of the city of San Juan.

*October 7, 1902.*—City of Mayaguez. Plans and project for the reconstruction and enlargement of the slaughterhouse of the city.

*October 29, 1902.*—City of Arecibo. Plans and project for the sewerage system of the city of Arecibo.

*November 25, 1902.*—City of Mayaguez. Plans and project amended for the reconstruction and enlargement of the slaughter house of the city.

*January 14, 1903.*—City of Guayama. Plans and project for the sewerage system of the city of Guayama.

*March 4, 1903.*—City of San Juan. Inspection and acceptance of the work of repairs of the pumping engines of the waterworks of the city of San Juan at Rio Piedras.

*April 23, 1903.*—Town of Manati. Inspection of the hospital and its acceptance recommended.

*May 14, 1903.*—City of Ponce. Plans and project for the completion of the civil hospital at Ponce.

*May 15, 1903.*—City of Ponce. Plans and project for the construction of a municipal building at Ponce Playa.

*June 1, 1903.*—City of Ponce. Plans and project for the completion of the work of improvement of the Plaza de Las Delicias at Ponce.

#### PERMITS FOR CROSSING PUBLIC ROADS AND FOR OTHER USES OF THE PUBLIC DOMAIN.

*June 17, 1902.*—To S. Nadal, Mayaguez. A permit subject to regulations to cross the main road between Mayaguez and Añasco with a track for transportation of sugar cane.

*July 30, 1902.*—Hilario Cuevillas, San Juan. A permit subject to conditions to place a drain pipe across and under the macadam of the road between San Juan and Rio Piedras.

*September 26, 1902.*—Pedro Iglesias. Requests to be allowed the use of the sand from a deposit in the bed of the river Loiza near Carolina.

*September 26, 1902.*—American Railroad Company of Porto Rico. Permit to make a deviation of the road from Mayaguez to San German at kilometer 19 for the railroad crossing.

*October 18, 1902.*—J. E. Gordon. Permit subject to regulations to open the roadway at Santurce to put a water pipe for house supply.

*November 11, 1902.*—Antonio Monroig. Permit subject to specified conditions to lay a narrow-gauge track along the San Bruno road for the transportation of sugar cane to his estate.

*November 25, 1902.*—American Railroad Company of Porto Rico. Permit subject to specified conditions and plans submitted for the crossing of the road between Ponce and Playa and the Ponce electric railway with the railway tracks.

*November 25, 1902.*—M. Fajardo. Permit subject to specified conditions to cross the road between Mayaguez and Pezuela bridge with a portable railway for hauling sugar cane.

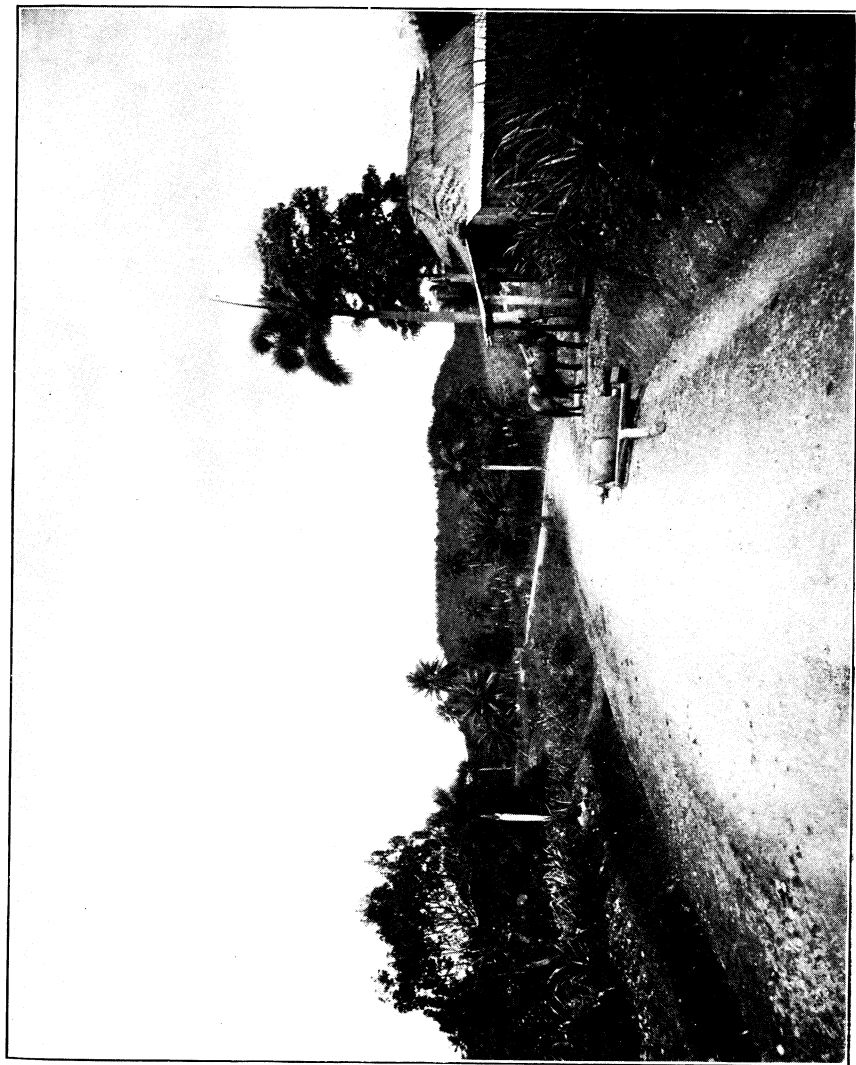
*December 26, 1902.*—Alfonso Fernandez, representative of W. Bass. Permit to build a protecting stone wall near the seashore at Naguabo.

*March 4, 1903.*—S. Sambolin. Permit subject to specified conditions to establish a portable track for hauling sugar cane between kilometers 18 and 19 of the road from Mayaguez to San German.

F. Calaf. Permit subject to specified conditions to close an old road near Manati replaced by a new road for which he has given free the right of way in his property.

Respectfully submitted.

P. F. FERNANDEZ,  
Assistant Superintendent of Public Works.



REPAIRED ROAD BETWEEN FAJARDO AND LUQUILLO.



SCHEDULE I.—*Synopsis of disbursements made by bureau of public works on account regular budget during fiscal year ending June 30, 1903.*

Designation.	Allotment.	Total disbursed to June 30, 1903.	Balance June 30, 1903.
Salaries.....	\$172,280.00	\$169,196.14	\$3,083.86
Contingent expenses.....	8,300.00	7,192.72	a 1,107.28
Maintenance and repair of roads.....	100,200.00	90,302.14	b 9,897.86
Maintenance and repair of public buildings.....	48,200.00	32,820.30	c 15,379.70
Expenses executive mansion.....	12,500.00	10,413.49	2,086.51
Total.....	341,480.00	309,924.79	31,555.21
a Outstanding liabilities on this balance.....			\$165.50
b Outstanding liabilities on this balance.....			7,597.84
c Outstanding liabilities on this balance.....			151.69
c Disbursed through the auditor's office.....			13,406.52
			21,321.55

SCHEDULE II.—*Synopsis of disbursements from appropriations of no fiscal year March 1, 1902, to June 30, 1903.*

Designation.	Appropriation.	Disbursed to June 30, 1902.	Total disbursed to June 30, 1903.	Balance.
Permanent repairs, executive mansion.....	\$7,000.00	\$1,308.57	\$6,995.80	\$4.20
Building cells, insane asylum.....	1,500.00	1,432.15	1,432.15	67.85
Permanent repairs, insane asylum.....	10,000.00		713.12	9,286.88
Convict labor, Humacao-Yabucoa road.....	10,000.00		59.76	9,940.24
Total.....	28,500.00	2,740.72	9,200.83	19,299.17

SCHEDULE III.—*Synopsis of disbursements made by bureau of public works on account of trust fund up to June 30, 1903.*

Designation.	Allotments.	Disbursements to June 30, 1903.	Available balance July 1, 1903.
Arecibo-Ponce road:			
Arecibo section.....	\$42,726.00	\$42,726.00	
Defendini to kilometer 15.....	90,000.00	90,000.00	
Adjuntas to Utuado, Rio Chico section.....	a 79,000.00	72,065.31	\$6,934.69
Manati-Ciales road, second section.....	49,698.00	34,291.67	15,406.33
Caguas-Humacao road.....	65,000.00	65,000.00	
San German-Pezuela bridge road.....	10,000.00	10,000.00	
Mavilla River bridge, first allotment.....	12,000.00	12,000.00	
San Sebastian-Lares road.....	75,000.00	49,659.18	25,340.82
Fajardo-Naguabo Playa road.....	10,000.40	10,000.40	
Yabucoa-Maunabo road.....	38,000.00	33,326.21	4,673.79
Cidra-Las Cruces road, first allotment.....	3,427.72	3,427.72	
San Lorenzo-Caguas road, first allotment.....	2,500.00	2,500.00	
San Rafael Culvert Humacao.....	1,800.00	1,800.00	
Aguas Buenas-Caguas road.....	1,000.00	1,000.00	
Surveys.....	51,218.87	51,218.87	
Yauco-Sabana Grande road.....	61,782.00	46,618.41	15,163.59
Retaining wall at Camiaco.....	b 28,262.00	28,262.00	
Right-of-way damages (various roads).....	2,637.89	2,637.89	
Bayamon-Comerio road.....	120,000.00	43,216.35	76,783.65
Mameyes-Fajardo road.....	26,000.00	25,222.09	777.91
Ponce-Guayama road.....	30,000.00	20,495.14	9,504.86
Camuy-Aguadilla road.....	29,000.00	25,198.88	3,801.12
Naguabo-Naguabo Playa road, second allotment.....	4,000.00	2,996.98	1,003.02
Portugues River bridge.....	4,250.00	157.20	4,092.80
Mayaguez-Cabo Rojo road.....	12,000.00	9,996.54	2,003.46
Arecibo-Ponce road.....	85,000.00	2,292.47	82,707.53
Anasco River bridge.....	8,500.00	34.35	8,465.65
Vega Alta road.....	5,000.00	289.16	4,710.84
San German-Lajas road.....	5,000.00		5,000.00
Caguas-San Lorenzo road, second allotment.....	15,000.00		15,000.00
Alfonito-Barranquitas road.....	15,000.00		15,000.00
Mayaguez-Consumo road.....	15,000.00		15,000.00
Las Marias road.....	30,000.00		30,000.00
Arroyo-Patillas road.....	10,000.00		10,000.00
Mavilla River bridge, second allotment.....	3,000.00		3,000.00
Total.....	1,040,802.88	686,432.82	354,370.06

a \$5,000 additional allotted December 26, 1902.

b Includes allotments of \$10,855 transferred from trust fund and expended on wall through removal of Landslides Bud. 1901-2.

## EXHIBIT B.

## REPORT OF THE SUPERIOR BOARD OF HEALTH.

DEPARTMENT OF THE INTERIOR,  
OFFICE OF THE SUPERIOR BOARD OF HEALTH OF PORTO RICO,  
*San Juan, P. R., July 2, 1903.*

SIR: I have the honor to submit the following report of the superior board of health for the year ending June 30, 1903.

By an act of the legislature which went into effect July 1, 1902, a reorganization of the board was made. A director of health was appointed, who is also ex-officio the president of the board. The board consists of seven members, four of whom are physicians, one a lawyer, one an engineer, and one a pharmacist. The vice director is also the secretary and disbursing officer of the board.

The board is appointed by the commissioner of the interior, and the members hold office for a period of two years. The members originally appointed were Dr. R. M. Hernandez, director of health; Dr. William Fawcett Smith, vice director, secretary and disbursing officer; Dr. Ruiz Arnau, Dr. Francisco del Valle Atilas, Mr. Fidel Guillermet, Mr. Tulio Larrinaga, and Mr. J. M. Keedy. Mr. Larrinaga having been elected to the legislature was obliged to resign his position, and the vacancy was filled by Mr. Ramón Gandía, a well-known engineer. Mr. Keedy has recently moved from Porto Rico, and his place has not yet been filled.

No material change has been made as to the duties imposed on the board, but power to arrest violators of sanitary laws has been given to the board and its officials, and this police power has proved to be a valuable aid in their work.

Speaking in general terms it may be said that the past year has been one of progress in sanitary matters, but the progress has been hampered by insuperable difficulties, and is therefore much less than would be the case under favorable conditions.

The majority of municipalities are financially unable to offer a suitable salary for medical officers, even when only one is employed, and there is no district in the island that could possibly be served efficiently by one man. But it has been only too common that even the miserable salary offered has not been paid regularly, and resignations follow as a matter of course. Owing to a lack of clearness in the act relating to health officers, their tenure of office is very uncertain, and the alcalde has had practically the power to dismiss or compel the resignation of a health officer on any pretext, the sufferer having no redress except an appeal to the governor. It has occurred in many cases that a health officer has been reinstated after unjust removal, but has found it impossible to retain the position if the alcalde were hostile.

Such conditions are incompatible with good service, and some radical improvement in the status of the profession must be made before we can see the results that we have a right to expect. Surely the question of health is at least as important as that of education, or of roads, but as yet no comprehensive or uniform system exists for the care of the sick poor, or for general sanitary work. As an example of the crude and hasty legislation on these matters, I would call attention to the following facts: In the original municipal law provision is made for the appointment of health officers and assistant health officers, all of whom must possess suitable medical qualifications, and whose duties are such as can be performed only by physicians. But the last legislature passed an amendment to section 48, municipal law, authorizing the employment of pharmacists as assistant health officers in those places where there were no medical men for the position. So far the new law has not been taken advantage of to any great extent, but it is certain that many difficulties will arise, and that the arrangement will lead to unsatisfactory results. The existing Spanish laws very wisely insist on the absolute separation of the profession of medicine and pharmacy, and any legislation is to be regretted that will tend to abolish this distinction.

Hospital accommodation is still very deficient, and there are several towns where there are no hospitals of any kind, and where the present financial conditions give little prospect that the need can be supplied. The consolidation of municipalities has not worked well from a sanitary point of view, for as a rule the annexed towns have been left in a worse condition than before, many of them having no medical officer, and none of them being supplied with adequate means for the most elementary sanitary service. Appeals for assistance are constantly being made to the board, but of course we can do nothing, as we have no funds at our disposal for such purposes.

The work of inspection by our two medical inspectors has been carried out with energy, and the importance of their work has been fully demonstrated.

The regular semiannual examinations for license in medicine and the allied branches were held in January and June, and the results are given in the subjoined table. The board suffered a heavy loss in the death of Mr. Ledesma y Saldaña, one

of the examiners in pharmacy, which occurred just before the last examination, and Mr. Calderon Aponte was thereupon appointed to fill the vacancy.

The general average of the papers sent in by the candidates was above that of previous years, the advance in pharmacy being very marked and reflecting great credit on the young men who have only limited opportunities for scientific studies.

	Passed.	Failed.	Total.
Physicians.....	3	1	4
Dentists.....	13		13
Pharmacists.....	4		4
Practicantes.....	3		3
Midwives.....			
Nurses.....			
Total.....	23	1	24

#### FOOD SUPPLIES.

I take pleasure in stating that there is a decided improvement in the quality of the food now coming into Porto Rico from foreign countries and in that prepared here. The great staples of flour and codfish are usually of good quality, and comparatively little of either has been condemned and destroyed. Some flour has been returned to the exporter, and some has been allowed to be used for other purposes than for human food. The board has recently issued regulations as to foods and liquors which are to take effect on August 1, 1903, and special attention has been given in them to the proper branding of all food stuffs. The old system of misleading labels will come to an end, and every package will be plainly marked with the true name of its contents and the place and name of its producer. Standards of purity for all articles of food have been designated, these having been based on those established in the United States, but with such modifications as were required by the peculiar local conditions here. Before the adoption of these regulations the board held conferences with representatives of the chamber of commerce and of certain other mercantile associations, and I am rejoiced to say that our propositions were met in a spirit which rendered easy a work that presented many points on which we might have expected opposition or obstruction. We recognize the fact that all persons can not purchase food of the highest grade, but we do insist that no one shall purchase anything blindfold or be deceived by an elaborate label that has no real connection with the article it is supposed to describe. No honest merchant can be injured by the new arrangements, and dishonest traders merit no consideration.

Of all articles of food, milk occupies the most important place, and the chemist of the board has devoted a large portion of his time to the daily examination of samples secured by our inspectors. Prosecutions have been numerous and the number of convictions has been considerable. But in spite of this vigilance and frequent punishment there are still dealers who seem constitutionally unable to act honestly and who appear able and willing to pay fines to any extent. Efforts are being made in the country districts to insure purity of the milk supply, and in some towns considerable success has been obtained, but, of course, the health officers have very limited means available for minute examination, and every possible dodge is resorted to in order to evade the law.

In May, 1903, a number of cases of poisoning by milk occurred in San Juan, but none of them terminated fatally, and it is believed that there is little reason to fear another outbreak, the source of the trouble having been traced and the necessary steps taken in connection with the dairy from which the milk came. In Dr. Berkeley's report (Appendix A) are given full details of his work in this and other branches, and it will be doubtless a surprise to many persons to learn the immense amount of work turned out under his hands. Much of this was impossible to be done in the former laboratory, but we have now rented a house opposite the office where we have ample space and where the chemists can work in comfort. We have just installed one of Tirrill's gas machines and will now be rid of the dirty, troublesome, and costly makeshifts with which the work has heretofore been carried on.

Since the date of last report the drainage of San Juan has been in progress, and nearly every street is now provided with a sewer. Orders have been issued for the connection of all houses with the sewer, and this work is being done as rapidly as possible with the limited number of competent workmen. As a consequence of this much plumbing work has followed, and for months to come every plumber will have his hands full. The old-fashioned latrine will shortly be extinct and every house will be fitted with modern sanitary plumbing. Very few cisterns are now used for drinking water, and as the aqueduct water is of fair quality there has been a very decided decrease in the amount of gastro-intestinal disease in San Juan. The most

serious question for the capital is the limited source of water supply, for the increase of consumption goes on steadily and the water supply from the present source is barely sufficient to meet the demand and can not be increased. The waste of water has always been very great and is due partly to carelessness of tenants and partly to cheap and imperfect plumbing fixtures. The city has introduced the plan of service by meter, and while this will undoubtedly save a certain amount of water it acts as a serious check on the use of water for baths, etc. Compared with other cities the cost of water is enormous, and it is only natural to expect that landlords and tenants should display their dissatisfaction with the exorbitant charge now levied. In a tropical climate water is of far greater importance than in colder lands, and anything that tends to limit its free use is a public danger; but in the present financial stress the municipality feels compelled to increase its income by every possible means. In the near future San Juan will be compelled to go to the Loiza River for water. Here can be found an ample and constant supply, and the quality of the water would be superior to that furnished by the Rio Piedras streamlet. Increased storage capacity must be provided in order to avoid disaster from failure of the pumping machinery, if the present works are to be maintained, and some system of filtration is imperatively needed. The system of sand filtration in large basins would be out of the question on account of the cost of construction and maintenance, but such a system as that known as the Jewell can be built and maintained for a wonderfully small sum. More than one hundred and fifty of these plants are now being worked in the United States by municipalities, and have been found efficient and economical to a surprising degree.

Our chemist is now engaged in examining the water supply of all towns in Porto Rico, but it will be a considerable time before this heavy task can be completed. The information thus derived will prove of the greatest value, and I am glad to say that much interest is shown in many quarters as to the result of the various analyses.

Vaccination has been carried on as usual, yet the lack of medical officials has been a serious drawback to the work; but in spite of everything, the good results of the work done have been very manifest and the diminution of smallpox has been very great. Only 103 cases have been reported during the year, and nearly all of these have been of a mild type of varioloid. No death from smallpox has occurred during the year.

A slight outbreak occurred in Aguas Buenas in April, and as the town had no resident physician, fears were expressed that the disease might spread to a serious extent. As in similar cases, the board applied to the governor for assistance, and he at once made an appropriation for the employment of a physician to deal with the matter. Vaccination was thoroughly carried out and the epidemic was promptly checked.

The lease of our vaccine station at Martin Peña expired in July, 1903, and the location being very unsatisfactory, the board purchased a tract of land in the Ceboruco district of Santurce and is now about to erect a house thereon. A sum of \$1,000 was appropriated for purchase of land and \$1,500 for the erection of the necessary buildings. It is of course impossible to do much with such a small sum and the equipment of the station will of necessity be very incomplete, but we hope that the next legislature may be induced to give us sufficient means to establish and maintain in the highest efficiency a work which is of such immense importance. Dr. A. Stahl is now in charge of the station, and his high scientific reputation is a guaranty that the work will be thoroughly well done.

Porto Rico has been singularly fortunate during the past year as regards contagious diseases, and in no case has there occurred an epidemic of any of these. Tuberculosis is, unfortunately, very prevalent, and any marked diminution in its ravages can not be looked for in the near future. The establishment of special sanatoria for this disease is out of the question, and many years must elapse before the mass of the people can be taught to realize the faults in their mode of living and to adopt the means of prevention so well known in other countries. Teaching of elementary principles of hygiene in the schools might be of some little value, but the good done in this way must necessarily be largely undone by the example of the home circle, and very few parents would accept and act upon the instruction conveyed by their children. Fresh air at night would still be regarded as a mortal enemy, and the danger from an invisible source would not be recognized as real.

The meat supply of Porto Rico is a subject which has largely occupied the attention of the board, and the laws recently passed on this matter have been enforced with very considerable success. Some opposition was to be expected, but a patient and firm course was adopted, and there is now very little difficulty in carrying out the laws and regulations. In every town the slaughterhouses and butcher shops have been revolutionized—the meat is properly protected from flies, etc., and the men employed are decently clothed. Some of the shops present an appearance that would be a credit to any place, and we find that the force of example is a powerful means of improvement, customers flocking naturally to the best-kept shops.



Bakeries are on the whole well conducted, and it is rarely that really bad bread is found. Complaint of bad quality is quickly made by purchasers, and the offending baker learns a valuable lesson by the destruction of the article and a heavy fine. Much flour of a poor quality was formerly sent to Porto Rico, but now the general average quality is good and a considerable quantity of first-class flour is imported. No case of adulteration of bread has been discovered, and it is believed that the practice does not exist.

I can not speak favorably on the subject of garbage disposal. Even in the large cities the system is defective and unsanitary, and in the small towns the arrangements are of such a primitive sort as to provoke a smile.

The board has for years urged the construction of crematories as the only scientific method of garbage disposal in cities, but so far without effect, and the prospect for success in its efforts appears remote. We have in San Juan a good object lesson in the small crematory used by the military authorities, this having proved a perfect success in solving a troublesome problem, and in the low cost at which it is run. The fuel used is wood, and the combustion is so perfect that there is absolutely no odor from the process and the residue consists merely of a small quantity of ash. Crematories of this pattern are in extensive use in the United States and England and are uniformly successful and satisfactory.

The question of cemeteries is still in a very unsatisfactory state, but some progress has been made in fact and much more is hoped for in the near future. The well-nigh universal excuse of municipal poverty is given as the reason for delay, and I fear that this excuse in many cases is true. San Juan is taking steps to provide further accommodation, and Ponce will shortly have a really creditable and handsome cemetery. The evidences of the hurricane are still visible in many cemeteries in the broken walls and ruined monuments, and overcrowding is still a melancholy fact; but scarcely a thought appears to be given to these things, and there is a general apathy to the matter which is amazing to those accustomed to see the dead regarded with due respect and cemeteries made attractive rather than repulsive. It is, of course, easy to point out defects, but it is difficult to see the way to remedy them, and until municipal finances are in a more flourishing condition than they are now we will not be able to be proud of our cemeteries. Elaborate plans have been submitted by various towns for the construction of new cemeteries, but they have always been accompanied with the statement that the cost was prohibitive, and this was perfectly true. If a town can not obtain one of these costly affairs it must put up with one which will serve the purpose and must wait patiently for the time when the more elaborate and ornamental work can be done. The municipal law empowers the superior board of health to undertake the construction of cemeteries where the municipality fails to do so, and to cover the cost the treasurer may collect a special cemetery tax. But the board has hesitated to take advantage of this provision in the existing state of affairs and would prefer that the work be undertaken directly by the towns interested.

The veterinary department has been carried on with extraordinary energy by Dr. E. Schirmer, and his resolute insistence on the observance of the laws and regulations has worked a real revolution. The prediction made in my last report as to the probable diminution of glanders has been fully verified, and it is reasonably certain that in a very short time glanders will no longer claim its human victims. The inspection of horses and mules was vigorously carried out in many of the towns of the island, and all cases of suspicious animals were always immediately ordered under strict quarantine and subjected, wherever possible, to the Mallein test.

Very great importance is given by every health board to the study of vital statistics, and the superior board of health is using every means in its power to make the returns of Porto Rico as complete as possible. Much interest is taken by outside countries in our reports, and our large mailing list of 500 is insufficient to meet the demand. We exchange with every State in the Union and with every great city, and our foreign exchanges include Mexico, Chile, Canada, and the Argentine Republic, copies of our reports being also sent to every consul here. I give with this report an abstract of the leading features as to the mortality statistics, and from this it will be seen that in spite of the great difficulties in the road the sanitary advance of the island is steady and is fully as great as can be expected. I can not omit mention of the very valuable assistance rendered to the board by the insular police. Without their aid much of our work would have been impossible, especially in those districts where there was no health officer, and we have always received from them cordial and intelligent cooperation.

Very respectfully,

R. M. HERNANDEZ, M. D.,  
*Director of Health.*

Hon. WILLIAM H. ELLIOTT,  
*Commissioner of the Interior.*

## Abstract of vital statistics of Porto Rico.

	Living births.		Deaths under—										Cause of death.										Total deaths.											
	Population.	Legitimate.	Illegitimate.	Still births.	Marriages.	5 years.	10 years.	20 years.	30 years.	40 years.	50 years.	60 years.	70 years.	80 years.	90 years.	100 years.	Age unknown.	Smallpox.	Cerebro-spinal fever.	Diphtheria.	Pneumonia.	Typhoid fever.		Typhus fever.	Dysentery.	Anemia.	Bronchitis.	Heart disease.	Tuberculosis.	Diseases of nervous system.	Accidents and violence.	All other diseases.	Glanders.	
Adjuntas.....	19,484	327	253	69	129	111	52	80	46	33	23	22	15	8	3	1	1	0	5	0	1	7	2	1	129	8	1	1	1	3	1	160	0	321
Aibonito.....	8,596	63	35	0	45	52	18	24	37	22	12	18	9	8	2	0	0	0	1	0	0	0	0	0	85	10	0	0	1	0	0	62	0	170
Aguada.....	10,581	217	47	6	112	100	12	21	31	22	12	18	9	8	2	0	0	0	11	0	0	0	0	0	30	33	0	0	1	0	0	130	0	259
Aguadilla.....	30,240	404	104	62	242	303	68	74	107	84	51	60	41	34	14	6	0	0	11	0	0	0	0	0	210	37	20	3	13	13	456	0	842	
Aguas Buenas.....	7,977	154	104	7	47	94	26	21	26	18	11	10	6	6	2	0	0	0	11	0	0	0	0	0	20	10	3	0	3	0	92	0	226	
Anasco.....	19,952	462	254	31	113	138	47	95	142	129	84	74	26	18	11	7	0	0	12	0	0	0	0	0	124	18	7	0	30	6	328	0	565	
Arroyo.....	36,910	636	570	151	125	471	95	149	179	194	129	84	46	41	22	1	0	0	21	0	0	0	0	0	218	36	22	3	13	4	673	0	1,305	
Barrios.....	22,948	512	170	11	127	158	47	103	149	166	109	49	40	31	16	4	0	0	23	0	0	0	0	0	207	54	20	1	11	8	177	0	491	
Bayamon.....	32,071	430	332	19	163	310	58	62	91	66	60	49	40	31	30	16	0	0	4	0	0	0	0	0	130	5	1	31	11	8	519	0	819	
Carolina.....	17,648	262	0	137	226	278	74	103	115	74	52	49	24	10	8	5	0	0	3	0	0	0	0	0	306	26	0	28	6	16	140	0	543	
Caguas.....	28,557	379	280	33	175	166	52	67	83	58	46	32	17	11	4	0	0	0	3	0	0	0	0	0	306	26	0	29	3	2	351	0	848	
Camuy.....	28,708	577	174	9	167	267	81	97	102	61	62	70	57	20	22	0	0	0	12	0	0	0	0	0	306	26	0	29	3	2	351	0	848	
Cabo Rojo.....	16,154	357	232	29	113	111	18	34	43	30	30	24	15	8	3	0	0	0	12	0	0	0	0	0	306	26	0	29	3	2	351	0	848	
Coamo.....	15,114	265	168	77	101	216	41	54	65	52	33	19	10	5	0	0	0	0	12	0	0	0	0	0	306	26	0	29	3	2	351	0	848	
Cayey.....	21,994	261	168	77	101	216	41	54	65	52	33	19	10	5	0	0	0	0	12	0	0	0	0	0	306	26	0	29	3	2	351	0	848	
Comerio.....	8,219	229	332	26	142	209	46	68	98	77	49	33	19	10	5	0	0	0	12	0	0	0	0	0	306	26	0	29	3	2	351	0	848	
Fajardo.....	16,782	333	302	26	142	209	46	68	98	77	49	33	19	10	5	0	0	0	12	0	0	0	0	0	306	26	0	29	3	2	351	0	848	
Guayama.....	23,347	324	510	0	180	432	74	73	52	45	32	36	11	4	0	0	0	0	12	0	0	0	0	0	306	26	0	29	3	2	351	0	848	
Hato Grande.....	21,862	437	232	26	172	279	46	73	52	45	32	36	11	4	0	0	0	0	12	0	0	0	0	0	306	26	0	29	3	2	351	0	848	
Humacao.....	22,915	344	429	17	112	201	18	36	43	36	27	27	19	23	2	0	0	0	12	0	0	0	0	0	306	26	0	29	3	2	351	0	848	
Isabela.....	14,888	142	63	0	131	113	18	36	43	36	27	27	19	23	2	0	0	0	12	0	0	0	0	0	306	26	0	29	3	2	351	0	848	
Juncos.....	27,896	623	590	88	156	298	51	112	125	67	69	51	21	8	11	3	0	0	12	0	0	0	0	0	306	26	0	29	3	2	351	0	848	
Juana Diaz.....	20,853	623	251	114	112	42	47	17	24	38	21	19	14	5	2	0	0	0	12	0	0	0	0	0	306	26	0	29	3	2	351	0	848	
Las Marias.....	11,779	225	161	9	89	46	17	24	38	21	19	14	5	2	0	0	0	0	12	0	0	0	0	0	306	26	0	29	3	2	351	0	848	
Lajas.....	8,789	225	161	9	89	46	17	24	38	21	19	14	5	2	0	0	0	0	12	0	0	0	0	0	306	26	0	29	3	2	351	0	848	
Manati.....	23,346	409	985	31	109	305	70	105	110	77	62	54	25	14	3	0	0	0	12	0	0	0	0	0	306	26	0	29	3	2	351	0	848	
Morovis.....	11,309	246	95	0	88	76	31	40	37	37	18	22	11	3	0	0	0	0	12	0	0	0	0	0	306	26	0	29	3	2	351	0	848	
Mayaguez.....	38,915	586	507	63	271	375	57	80	180	132	114	103	71	8	2	0	0	0	12	0	0	0	0	0	306	26	0	29	3	2	351	0	848	
Martinez.....	8,312	115	198	17	43	100	8	20	28	13	11	10	8	2	0	0	0	0	12	0	0	0	0	0	306	26	0	29	3	2	351	0	848	
Murcio.....	10,873	125	110	16	92	113	22	29	33	26	17	11	19	11	6	1	0	0	12	0	0	0	0	0	306	26	0	29	3	2	351	0	848	
Naguabo.....	11,063	186	130	9	173	113	32	29	33	26	17	11	19	11	6	1	0	0	12	0	0	0	0	0	306	26	0	29	3	2	351	0	848	
Patties.....	77,116	986	667	215	461	523	18	121	218	125	96	99	39	31	15	8	1	0	18	0	0	0	0	0	93	21	20	1	15	1	925	0	1,357	

Rio Grande.....	21,887	131	0	133	297	36	47	49	37	17	17	23	24	23	8	8	0	13	0	1	0	4	39	10	0	4	35	2	3	7	6	1	140	0	369		
Rio Piedras.....	13,760	113	26	83	122	12	29	12	22	17	24	28	24	28	7	3	0	0	1	1	0	1	23	5	3	3	2	218	11	4	21	2	0	147	0	298	
San S. Justian.....	16,112	255	79	17	134	81	68	89	67	24	24	28	24	28	11	7	0	0	1	1	0	0	23	5	3	3	2	44	11	4	13	4	0	166	0	456	
Sabana Grande.....	10,560	212	143	9	89	111	28	40	32	20	20	16	16	16	5	2	3	0	1	0	11	0	0	8	5	3	13	216	12	0	4	17	0	186	0	291	
San German.....	20,246	461	276	53	110	131	25	47	68	75	41	44	44	44	35	38	12	8	1	0	0	0	7	5	3	13	216	12	0	4	17	0	266	0	548		
San Juan.....	32,048	471	440	88	313	351	51	161	198	83	60	61	30	60	61	30	20	11	1	2	0	19	2	1	38	0	1	3	31	23	32	125	16	7	656	1	983
Santa Isabel.....	4,858	84	112	13	51	56	3	11	19	12	12	7	7	7	4	2	3	3	0	0	0	1	6	0	0	0	6	0	2	9	1	1	106	0	132		
Toa Alta.....	23,220	289	165	6	85	169	42	55	55	34	24	28	28	28	26	15	9	1	2	0	5	1	6	4	3	18	128	23	5	19	8	5	273	0	506		
Utua.....	43,860	638	583	1	264	331	147	155	123	87	72	72	72	72	22	16	6	4	0	3	0	0	2	16	12	0	4	556	51	1	26	19	2	354	0	1,049	
Vega Baja.....	16,412	225	219	11	99	194	44	64	79	35	36	36	36	36	22	16	2	0	0	1	1	1	2	3	1	5	220	13	3	61	7	2	225	0	549		
Vieques.....	6,642	142	183	9	49	140	13	22	31	27	24	12	12	12	15	11	8	4	0	1	0	7	0	6	1	17	10	24	5	4	15	6	2	209	0	307	
Yabucoa.....	20,126	186	177	11	117	235	43	60	73	46	55	45	45	45	23	15	13	3	1	2	0	6	3	26	6	4	19	126	20	8	24	2	2	361	0	612	
Yauco.....	27,119	472	594	66	186	407	22	74	130	77	47	43	43	43	32	29	6	6	1	6	0	0	0	56	15	3	6	135	58	0	66	6	5	518	0	874	
Total.....	953,243 15,456 11,476 1,427 6,324 9,490 1,775 2,457 3,445 2,374 1,829 1,643 1,155 780 386 193 24 126 1,225 29 76 630 179 170 355 6,805 997 331 1,442 352 186 13,625 2 25,561																																				

Annual death rate per 1,000, from July 1, 1902, to June 30, 1903, 26.7

## APPENDIX A.

## ANNUAL REPORT OF THE DIRECTOR OF THE CHEMICAL LABORATORY OF THE SUPERIOR BOARD OF HEALTH OF PORTO RICO FOR THE YEAR ENDING JUNE 30, 1903.

SAN JUAN, P. R., *June 30, 1903.*Dr. R. M. HERNANDEZ, *Director of Health.*

SIR: I have the honor to submit the following report relative to the work of the chemical laboratory of the superior board of health for the year ending June 30, 1903:

## GENERAL CHARACTER OF THE WORK.

The experience acquired throughout the time that had elapsed since the inauguration of this branch of the work of the superior board of health seemed abundant warrant, on beginning the investigations of the year just ended, for a continuance of these along the same lines that had been followed previously, and which had consisted almost entirely of investigations of food articles found in this and the other towns of the island.

If there is anything that does distinguish the work of the past year from that of the preceding two and a half years, it consists, perhaps, in the even greater amount of time and attention given to an examination of the milk supply, a question generally recognized as of such vital importance to the sanitary welfare of all communities that I do not think that any apology need be made for the relatively great amount of time devoted to it.

A glance at the adjoined table (No. I), prepared by the assistant chemist, Mr. Rafael Del Valle, shows that of the total number of all kinds examined throughout the past year 426, or 77.31 per cent, were samples of milk, of which 54, or 12.6 per cent, were secured by the inspectors of the board from consignments reaching San Juan and Santurce from the various vaquerias, or dairy farms, in the barrios of Carolina, Río Grande, Río Piedras, Manatí, Vega-Baja, etc., while 314, or 73.7 per cent, were taken in the various milk depots of San Juan, Santurce, and Puerta Tierra, and 55, or 12.8 per cent, in the insane asylum and charity schools of Santurce.

## CHANGE IN THE LOCATION OF THE LABORATORY.

The transfer, in November of 1902, of the laboratory from the custom-house to the present location at No. 10 Fortaleza street, although involving a suspension of work in the latter part of that month, resulted in such a general improvement in our surroundings as to be an abundant compensation for the interruption incurred.

Among the most notable improvement has been the acquisition of more room available for laboratory purposes, which has finally made possible the fitting up of a room especially for water analysis, but which has also been utilized in the toxicological examinations requested on the part of the department of justice, and which can now be made free from the publicity and interruptions formerly inevitable.

## GREATER PROMPTNESS ON THE PART OF THE COURTS IN THE DECISION OF LEGAL CASES.

Another most gratifying improvement has been the greater promptness with which cases recommended for prosecution have been carried to a definite conclusion. Not only is action on the part of the justices of the peace much more prompt, but reports of their decisions in all cases submitted to them by the board are sent with equal promptness, so that it is now possible to keep a record of all such cases which will in the future form a part of the annual report of this laboratory.

In Table No. IV is given a statement of the total number of cases recommended during the past year, the decisions in these cases as reported by the courts, and the fines imposed. A consideration of this table will show that the belief expressed before the establishment of this laboratory that it would be, to a great extent, self-supporting was well founded, for in addition to the fact that it has been impossible to learn of the amount of fines imposed by at least one of the now extinct municipal courts of San Juan it is confidently believed that the coming year will show a very considerable advance in the amount of fines imposed on violators of the food and drug regulations, not of course by reason of any increase in the number of violations of them, but rather because of the increased stringency of these in many respects and also, I hope, as a result of a more efficient enforcement of them.

## NEW REGULATIONS GOVERNING THE SALE, ETC., OF FOOD AND DRUGS.

The application of the regulations governing the sale, etc., of food and drugs, as at present contained in the "Regulations and rules of the superior board of health," compiled as these were, hurriedly and from insufficient data, has developed many of

the imperfections arising from such an unsatisfactory manner of compiling them, but, while perfection in this respect is only to be hoped for as the result of slowly acquired experience, it is thought that the revised regulations that are to become effective the 1st of August will be found adequate in all cases that are liable to arise.

#### URGENT NEED OF A SYSTEMATIC EXAMINATION OF IMPORTED FOOD ARTICLES PROMPTLY AFTER THEIR ARRIVAL.

I would respectfully repeat the suggestions made in my report of last year in regard to a more effective and systematic examination of all imported articles of food, sampled on the wharves or in the custom-house, as promptly as possible after their arrival, and in all cases before they reach the public market. As I indicated at that time, not only would such examinations enable us to discover, with greater certainty and promptness, those really responsible for the condition of such articles as might be found to be adulterated, or for other reasons unfit for sale, but they would at the same time go far toward the removal of any just ground for those complaints that are at times brought against the board for its failure to adopt all possible means to guard against the possibility of unjust prosecutions of those who may be ignorant of any violation, on their part, of your regulations.

#### DIFFICULTIES IN THE WAY OF MAKING THE EXAMINATIONS ABOVE MENTIONED.

A very serious obstacle hitherto in the way of having such examinations made with the regularity that we have always recognized as desirable has arisen from the inability to secure from the collector of customs authority for the inspectors to secure the necessary samples before the articles to be sampled were "despatched." This, however, of course, applies only to European importations, and a solution will no doubt be furnished to the problem by the importers themselves, who have shown a commendable willingness to aid the board of health in the matter.

A much more serious obstacle, though, arises from the limited number of inspectors available for such work. The multitudinous duties devolving upon the three assigned to San Juan, Santurce, and Puerto Tierra and the "Marina" make it a physical impossibility to conduct such examinations with the frequency that is absolutely necessary if we hope to render even moderately effective the provisions of our new regulations, and such an effective enforcement of them will become possible only by increasing the number of our inspectors or by removing some of the duties now devolving upon them.

As the request made by the superior board of health for more inspectors was not granted, the latter of the two methods of solving this problem seems the only one available, and I would, therefore, respectfully suggest that arrangements be made with the local board of health by which that part of the burden now resting on the inspectors of the superior board, which consists in securing for analysis articles of food from the various places of sale in San Juan, Santurce, Puerto Tierra, and the Marina, be transferred to the local inspectors of these localities, or in lieu of these to members of the insular police force, duly authorized by the police commission and the superior board of health.

To establish new food regulations without at the same time making a determined effort to enforce them is simply to invite criticism and welcome censure.

#### MANNER IN WHICH THE NEW FOOD AND DRUG REGULATIONS WERE COMPILED.

The revised "Regulations governing the sale, etc., of foods and drugs in Porto Rico," to which reference has already been made, are largely based on the regulations applying to this subject, as set forth in Bulletins 61 and 69 of the Bureau of Chemistry, United States Department of Agriculture (in which are contained the food laws of several of the European countries, those of all of the States and Territories of the United States, as well as those of Hawaii, and the old regulations of the superior board of health of Porto Rico), while the matter referring especially to standards was compiled from the works of Allen, Battershall, Blyth, Girard and Dupré, Lewkowitsch, and Robinson and Cribb.

As these regulations were established primarily, not as a means of securing the conviction of those guilty of violations of their provisions, but rather with a view of making such violations more difficult, especial emphasis has been placed on the proper labeling of all articles of food or drugs, and we shall insist that all such articles, sold or offered for sale in Porto Rico, shall be marked so distinctly and unequivocally that there can be no doubt as to the real kind and class of the article described.

Whenever conditions peculiar to Porto Rico have suggested the propriety of greater leniency than is observed in similar matters elsewhere, the necessary modifications of the requirements of other countries has been made, the principle that has served

as a guide in the compilation of these regulations having been to allow the greatest leniency compatible with a proper regard for the public health.

#### MEANS ADOPTED TO GIVE PUBLICITY TO THE PROVISIONS OF THE NEW REGULATIONS.

As a means of giving the greatest possible publicity to the provisions of the new food and drugs regulations prior to their final adoption, copies were sent to the newspapers throughout the island with the request that they print them, and, later, other preliminary copies were printed and distributed to those requesting them, while the attention of the foreign consuls in San Juan was called to the necessity of advising their respective head offices of their provisions.

In addition to this, two conferences were held with representatives of the San Juan Chamber of Commerce and of the retail dealers in food articles in San Juan, who accepted with practical unanimity the requirements proposed. It is believed that these conferences were valuable, not only in securing the willing acquiescence of the merchants to the provisions of the regulations and their offer of aid in making these effective, but also as an opportunity for an expression of the board of health as to their purposes and desires in the general matter of food supervision.

#### BRIEF STATEMENTS RELATIVE TO THE VARIOUS CLASSES OF FOOD ARTICLES EXAMINED.

Below will be found brief statements relative to the various classes of articles examined, the order in which they are discussed corresponding with the number examined in each class.

In the case of milk a table has been prepared by Mr. Del Valle showing the number of samples examined each month, and also the average composition per month and for the entire year.

##### MILK.

The use of milk by all sorts and conditions of people, and the persistence with which it is adulterated and subjected to all manner of contaminating influences, fully justify, I think, the very great amount of time and attention devoted to it.

Comparing the data of the year just ending with that of the one immediately preceding, we find that while the total number of samples of all kinds examined decreased from 535 in 1901-2 (June to June) to 515 in 1902-3 (June to June), the number of samples of milk examined increased from 403 in 1901-2 to 423 in 1902-3, or from 75.33 to 82.14 per cent of the total number of all kinds examined in these respective periods. In the year 1901-2 of the total number of samples of milk examined 285, or 62.64 per cent, were classed as "good," 86, or 18.9 per cent, as "inferior," and 84, or 18.46 per cent, as "adulterated," while the corresponding figures for 1902-3 are 240 (56.34 per cent), 98 (23 per cent), and 88 (20.66 per cent) respectively.

A mere glance at the adjoined tables (II and III) shows how little justification there is for the complaints sometimes made by the milk dealers that the standard established for milk is too high, for as is seen, the percentage of fat ranges from a minimum of 3.32 per cent, representing the average composition of the 26 samples examined in February, to a maximum of 3.98 per cent in May when 19 samples were examined, and it must be borne in mind that these averages include a large number of samples that were undoubtedly adulterated. Taking the average of the genuine milk, we find that the average minimum and maximum percentages are 3.64 and 4.08 per cent, respectively. It is also evident, from a study of these figures, that the plea that the poor quality of the milk is due to excessive rainfall "will not hold water," for the lowest average of fat contents was found in February, one of the "dry" months.

##### FLOUR.

Unlike the samples of almost all other kinds examined during the past year, the greater part of the flour was secured from towns other than San Juan, and, for the most part, was examined at the request of health officers who had temporarily suspended its sale.

While the data secured shows that the adulteration of flour with harmful substances is practically unknown here, it however furnishes evidence confirmatory of that secured hitherto pointing to the generally inferior character of the flour found in this market. Of the 22 samples examined, 14 were found to be "inferior" (some exceedingly so) while 1 was reported to contain alum.

##### WATER.

In addition to the fact that any conclusions as to the character of a water based on the data secured from a single examination of it are of a very doubtful value, in many cases, the further fact that the samples reaching us very frequently show the evidence of gross carelessness on the part of those securing them necessarily make the classification of water samples a more or less difficult problem, so that the

description of 9 of the 19 samples examined during the past year as "good" and the remainder as "inferior" must be regarded rather as a mode of expressing the condition of these particular samples when they reached this laboratory than any very positive statement as to the quality of the water from which they were taken, as such information can be acquired only from a study of the data of several samples from the same source, taken with all possible precautions to prevent the introduction of extraneous matter, and known to represent the actual condition of the water at the time the sample was secured.

The 19 samples examined were gotten from the following points, viz: five from San Juan, 4 each from Lares and Santurce, and 2 each from Caguas, Mayaguez, and Vieques.

The classification of water samples (so far as purely chemical means are concerned) is based on determinations of the residue after the evaporation of the water at the temperature of 100° C., chlorine, nitrogen in the form of nitrates and nitrites, respectively, ammonia (free and albumenoidal) and "dissolved" and "required" oxygen (Kubel's process modified). The methods employed are those given by Prof. W. P. Mason in his little work on the "Examination of water" (chemical and bacteriological). In many cases though, owing to an insufficient supply of the water, or for other reasons, I have not been able to make all of the determinations mentioned above, and, indeed, frequently this is not necessary.

At the time of preparing this report samples of water are being received from a large number of the towns of the island, and it is thought that the next year will add very much to our knowledge of the public water supply throughout Porto Rico.

In addition to the requests for samples which have been sent to all of the health officers of the island, circulars have also been sent to these containing the following questions, viz:

(1) What is the source of the water supply of your district? (2) If secured from various sources, what percentage, approximately, of the total number of consumers use the water from each source? (3) If river water is used, is this taken directly from the stream or is it carried first to "deposits" (reservoirs)? (4) In waters thought to be polluted, what is the nature of the contamination? (5) Do you attribute any sickness that may have occurred in your district to the use of polluted water; and if so, what has been the nature of such sickness? (6) Do you think that any improvement that may have occurred in the public health of your district has resulted from a corresponding improvement in the water used? (7) What measures are employed in your district to prevent contamination of the public water supply?

The health officers have been asked to be very careful in answering the above questions to exclude from their reports everything that they do not know from personal knowledge, so that it is thought the information secured in this way will serve as a reliable basis for any measures that may be taken with a view of making such improvements in the water supply as are found to be necessary.

#### BUTTER.

A most gratifying improvement in the quality of the butter brought to this market has been noted throughout the past year or two, the gross adulteration, formerly so common, being now happily conspicuous by its absence. It is thought that any future concern in connection with this subject will arise only from the efforts of some dealers to give, by means of misleading labels, a higher character to their wares than they deserve, though all will probably be entitled to recognition as legitimate members of the butter family, a claim to which many samples coming here hitherto had no manner of right.

Much of the improvement in the quality of the butter should probably be attributed to the introduction into the island by the United States Department of Agriculture of an American brand of very good quality at the price formerly paid for butter of a more inferior kind. Although I can not speak with the certainty of personal knowledge, I am very much inclined to believe that the introduction of this butter has very materially decreased the sale of that imported from Denmark formerly, and possibly still largely used here. I find from figures furnished me by the collector of customs that there has been a decided increase.

#### VINEGAR.

It is believed that the quality of the vinegar as found in this market has improved very decidedly, though the limited number of samples examined during the year do not permit me to make any positive statement to that effect.

#### ANIS.

As up to the present time we have been unable to find in any of the works on foods any data referring to anis, the classification of the eight samples examined indi-

cates merely a more or less close agreement on the part of six of these with what we are led to believe to be the normal composition of the anis sold in Porto Rico. A much more extensive investigation of this subject will be needed to enable us to establish a proper standard for this article. Nothing so far learned indicates adulteration of this substance with anything of a harmful nature.

#### OLIVE OIL.

The examination of seven samples of olive oil has furnished evidence corroborating that secured previously all pointing to the fact of the very great extent to which adulterated oil is sold here. Time has not permitted any quantitative determination of the adulterants employed in the various samples examined, but cotton-seed oil is of course the most common.

#### LARD, BREAD, COFFEE, SUGAR, WINE, BRANDY, CHEESE, ETC.

The small number of these articles examined do not furnish sufficient evidence on which to base any conclusions of value as to their quality, or the extent to which they are adulterated, though there is no reason for believing that a more extended investigation would furnish data essentially different from that of former years when practically all of the samples of so-called "lard" were found to be "compound lard," and the wine generally of an inferior quality.

Judging from what is seen in San Juan, and what is learned from references to the subject in the newspapers, there has been a decided improvement in the quality of the bread sold in all parts of the island.

#### MISCELLANEOUS ANALYSES.

In addition to the articles itemized in Table I there were 31 miscellaneous samples examined, including 12 examinations made for the department of justice, in connection with criminal cases, 10 of which consisted of examinations of food and other articles supposed to contain poisonous substances, and two were examinations of clothing with the purpose of identifying stains thereon.

#### RECOMMENDATIONS.

The gradual awakening of the public to a sense of the importance of a chemical examination as a weapon in sanitary warfare, and the very appreciable increase in the number of samples coming to this laboratory from various points of the island during the past year, simply emphasize what I have intimated in former reports as to the urgent need of an increase in the number of chemists and inspectors of the superior board of health.

If the past year has furnished evidence of our inability to exercise a proper supervision even over the food supply alone, the year now beginning will certainly emphasize this fact, for, if we are going to make an effort to enforce the new regulations at all commensurate with the need for it, an extension of the work directly connected with the laboratory in all directions seems absolutely necessary.

Taking for example the subject of milk, the new regulations require not only, as hitherto, a strict adherence to the established standard of composition, but also impose rigid conditions as to the care of it and mode of transportation. To neglect to take such precautions is certainly most irrational, and it seems to me that recent events (the poisoning of a number of people presumably by diseased milk) point to the imperative necessity of a more adequate protection of the fountain head of the milk supply, i. e., the dairies.

I regard the examination of the dairy farms of the island (including the persons who actually handle the milk at the various stages of its journey from the cow to the consumer) not only highly desirable but absolutely necessary if we are going to devote to this subject the attention that it richly deserves. Certainly the examination of the cows of all dairies furnishing milk to the public market by a competent veterinarian at least once a year would reveal conditions that demanded rectification, and I think this should be done even if it involves injury to some other branch of our work.

But while milk and many other articles of food deserve a greater amount of attention than it is at present possible to give them, there is a no less urgent need to extend the range of our investigations so as to include many articles at present practically neglected. Of these the most important are probably drugs and medicinal preparations, while preserved goods, spices and condiments, baking powder, liquors, etc., should no longer be altogether neglected as heretofore.



## PUBLICATION OF BULLETINS, ETC.

I would respectfully repeat the recommendations of my report of last year in regard to the very great desirability of publishing from time to time bulletins describing the work of this laboratory, giving in brief the nature of the investigations prosecuted and the results of these, supplementing this by useful information as to the more common adulterants of the various articles discussed, and describing, whenever possible, some simple means for the detection of these. It is no less unfortunate than true that, in the minds of many, the sole purpose of our investigations is to secure incriminating evidence to be used against violaters of the food law, the true relation between such violations and the sanitary welfare of the public being altogether unexplained and, consequently, not understood.

The most effective means to secure the cooperation of all classes in our work is to educate them, in the manner indicated, as to the real purpose and ultimate aim of all sanitary measures.

## ACKNOWLEDGMENT.

The majority of the examinations made throughout the past year were made by Mr. Rafael Del Valle, the assistant chemist, who has continued to discharge the duties of his position in a most satisfactory manner, displaying very considerable enthusiasm in the work and rendering very valuable aid in systematizing it.

Messrs. Maymó, Maturana, and Barrante, the inspectors for San Juan, Santurce, Puerta Tierra, and the Marina, respectively, have also rendered indispensable aid in a most satisfactory manner.

In conclusion, I would most gratefully acknowledge the uniform courtesy of the newspapers of the island in publishing gratuitously all information sent them relating to the laboratory. They have in this way aided most materially in the dissemination of knowledge that it was desirable the public should have, and have unquestionably been a valuable factor in stimulating that rapidly growing appreciation on the part of the public of the work of the superior board of health.

Respectfully submitted.

WM. N. BERKELEY,  
*Director of the Laboratory.*

TABLE No. I.—*General summary of the examinations made throughout the year 1902-3.*

Total number of samples examined, 551.

## GENERAL CLASSIFICATION OF SAMPLES.

	Number.	Per cent.
Good.....	270	51.92
Inferior.....	149	28.65
Adulterated.....	101	19.42

## ITEMIZED CLASSIFICATION.

Articles.	Good.	Inferior.	Adulterated.	Per cent.		
				Good.	Inferior.	Adulterated.
Milk.....	240	98	88	56.34	23	20.6
Flour.....	7	14	1	31.43	62.86	5.7
Water.....	9	10	.....	47.37	52.63	.....
Butter.....	1	9	4	7.14	64.3	28.56
Vinegar.....	1	6	2	11.11	66.66	22.23
Anis.....	6	2	0	75	25	.....
Olive oil.....	1	5	1	14.29	71.42	14.29
Lard.....	1	.....	4	20	.....	80
Bread.....	1	2	.....	33.34	66.66	.....
Linseed oil.....	1	.....	1	50	.....	50
Sugar.....	1	.....	.....	100	.....	.....
Coffee.....	.....	1	.....	.....	100	.....
Wine.....	.....	.....	.....	.....	100	.....
Brandy.....	.....	1	.....	.....	100	.....
Cheese.....	.....	1	.....	.....	100	.....
Miscellaneous.....	.....	1	.....	.....	100	.....

TABLE NO. II.—Average monthly composition of all milk examined in the laboratory during the year ending June 30, 1903.

## ANALYTICAL DATA.

Month.	Specific gravity (15.5).	Water.	Solids.	Nonfat solids.	Fat.
		<i>Per cent.</i>	<i>Per cent.</i>	<i>Per cent.</i>	<i>Per cent.</i>
July .....	1.0315 (46)	87.54 (34)	12.46 (34)	8.87 (34)	3.59 (46)
August .....	1.0314 (42)	87.75 (38)	12.25 (38)	8.72 (38)	3.53 (43)
September.....	1.0314 (30)	87.17 (30)	12.83 (30)	8.85 (30)	3.98 (30)
October.....	1.0325 (12)	87.18 (9)	12.82 (9)	9.18 (9)	3.64 (12)
November.....	1.031 (13)	87.36 (10)	12.64 (10)	9.30 (10)	3.34 (14)
December.....	1.0311 (15)	87.35 (10)	12.65 (10)	8.79 (9)	3.86 (19)
January.....	1.029 (1)				3.61 (7)
February.....	1.0316 (23)	87.96 (24)	12.04 (24)	8.72 (24)	3.32 (26)
March.....	1.0323 (87)	87.98 (51)	12.02 (51)	3.63 (51)	3.39 (94)
April.....	1.0324 (43)	87.61 (26)	12.39 (26)	8.83 (26)	3.56 (53)
May.....	1.0313 (21)	87.22 (20)	12.78 (20)	8.93 (20)	3.93 (21)

NOTE.—The figures in parentheses refer to the number of samples examined.

TABLE NO. III.—Average monthly composition of all samples of genuine milk examined in the laboratory during the year ending June 30, 1903.

## ANALYTICAL DATA.

Month.	Specific gravity (15.5).	Water.	Solids.	Nonfat solids.	Fat.
		<i>Per cent.</i>	<i>Per cent.</i>	<i>Per cent.</i>	<i>Per cent.</i>
July .....	1.0313 (35)	87.06 (24)	12.94 (24)	9.09 (24)	3.85 (35)
August .....	1.0319 (31)	87.41 (26)	12.59 (26)	8.94 (26)	3.65 (31)
September.....	1.0316 (28)	87.04 (28)	12.96 (28)	8.91 (28)	4.05 (28)
October.....	1.0325 (12)	87.18 (9)	12.82 (9)	9.18 (9)	3.64 (12)
November.....	1.0313 (11)	86.95 (8)	13.05 (8)	9.45 (8)	3.60 (12)
December.....	1.0316 (14)	87.11 (9)	12.89 (9)	8.97 (8)	3.92 (18)
January.....	1.029 (1)				3.61 (6)
February.....	1.0329 (15)	87.40 (15)	12.60 (15)	9.19 (15)	3.51 (17)
March.....	1.033 (64)	86.99 (25)	13.01 (25)	9.35 (25)	3.76 (68)
April.....	1.0325 (32)	86.98 (14)	13.98 (14)	9.30 (14)	3.78 (41)
May.....	1.0312 (19)	87.04 (18)	12.96 (18)	8.88 (18)	4.08 (19)
June <sup>a</sup> .....					

<sup>a</sup>No milk examined in this month.

NOTE.—The figures in parentheses refer to the numbers of samples examined.

TABLE NO. IV.—*Judicial proceedings instituted by the superior board of health of Porto Rico for infractions of the food and drug regulations, as reported by the chemists of the board.*

Total number of prosecutions recommended during the year ending the 30th of June, 1903, 68.

Nature of offense:	
Selling adulterated milk .....	62
Selling adulterated vinegar .....	2
Selling adulterated lard .....	2
Selling unwholesome flour .....	1
Selling adulterated butter .....	1
Number of convictions by justices of the peace .....	53
Number of acquittals by justices of the peace .....	7
Number of appeals sustained in district court .....	5
Number of cases not reported by the justices of the peace .....	3
<hr/>	
Amount of fines imposed by the justices of the peace .....	\$870. 05
Amount of fines remitted by the district courts .....	141. 40
<hr/>	
Net amount of fines collected .....	738. 65

## EXHIBIT C.

## REPORT OF THE ASSISTANT COMMISSIONER OF THE INTERIOR.

DEPARTMENT OF THE INTERIOR OF PORTO RICO,  
BUREAU OF AGRICULTURE AND MINES,  
*San Juan, July 18, 1903.*

SIR: I have the honor to submit the following report of the bureau of agriculture and mines for the fiscal year ended June 30, 1903:

Until the beginning of the past year the work of the bureau had been limited to collecting data regarding the importance of the principal crops, furnishing information on matters connected with agriculture and mining, and carrying out the business relative to mining claims and concessions. At the second session of the first legislative assembly an appropriation of \$1,000 was made for the publication and free distribution by this bureau of an agricultural bulletin, and provision was also made for the addition of a clerk translator to the two clerks and the typewriter that, under the supervision of the undersigned as chief, were all the employees of the bureau.

## AGRICULTURAL BULLETINS.

The appropriation for the agricultural bulletin became available July 1, 1902, and from this date the publication of the same has been carried on regularly. During the year 12 bulletins have been issued, aggregating 436 pages of printed matter and 14,400 copies. The subjects treated in these bulletins are as follows:

- No. 1. Algunas nociones que deben tenerse presente en la propagación de los árboles frutales; Métodos de propagación del naranjo y demás frutas del género Citrus; Medio de conservar y economizar la humedad del suelo.
- No. 2. El cultivo del tabaco; Métodos de curar el tabaco.
- No. 3. Cultivo de la piña.
- No. 4. Notas sobre el cultivo del algodón.
- No. 5. Cultivo del arroz en los Estados Unidos.
- No. 6. Cultivo de la papa (patata) en los Estados Unidos.
- No. 7. La sombra en el cultivo del café.
- No. 8. La cría del cerdo en el sur.
- No. 9. Cultivo de la cebolla.
- No. 10. Cultivo del maíz en el sur.
- No. 11. Cultivo de la vainilla.
- No. 12. Fabricación de queso en las estancias; Fabricación de mantequilla en las estancias.

These are for the most part translations into Spanish of, or compilations from, bulletins published by the United States Department of Agriculture. Some of those bulletins treat of matters that are properly of tropical agriculture, and the others, though referring to methods of raising certain crops or domestic animals in the

United States, will be of great value for the Porto Rican farmers, as they refer to crops and animals that are or can be successfully raised in Porto Rico, are of a practical character, and contain advice and suggestions directly applicable or easily adaptable to our agricultural conditions. Numerous letters received from all parts of the island show that the bulletin is becoming popular, and that the farmers greatly appreciate the information given in the same. Over one thousand applications have been received for inscription in the mailing list, and this is daily increasing. Of Bulletins No. 1 to No. 11, 13,343 copies have been distributed. Bulletin No. 12 has just been delivered by the printer, and is to be distributed soon. The cost of printing these publications has been \$790, including the reprint of 500 copies of Bulletin No. 1.

## CROPS.

By lack of means it has not been possible to collect exact information regarding the extent and condition of the crops in the island during the past year. Through some private reports, and figures obtained from the collector of customs regarding the exports of agricultural products, the following remarks can be made:

*Sugar.*—The extent of cane plantations and the corresponding production of sugar has continued to increase. The amount of sugar yielded by the cane ground during the year 1902 was about 221,120,000 pounds—an increase of 29,400,000 pounds, or more than 15 per cent over the sugar produced during 1901. Of that produced during the present year of 1903, about 140,000,000 pounds were exported up to June 30, and it may be safely estimated that the output for the whole year will show an increase of more than 20 per cent as compared with the output for 1902.

The amount of sugar and molasses exported from Porto Rico during each of the last three fiscal years was as follows:

Year.	Sugar.	Molasses.
	<i>Pounds.</i>	<i>Gallons.</i>
1900-1901 .....	137, 817, 470	2, 848, 314
1901-2 .....	183, 822, 636	3, 080, 132
1902-3 .....	233, 070, 000	3, 537, 000

The exportation of sugar during the fiscal year 1902-3 was larger than the largest annual exportation ever before recorded, which was during the calendar year 1884, and amounted to 215,071,523 pounds.

*Coffee.*—The estimate made in the previous report of this bureau of the normal annual output of the coffee groves now existing in the island amounted to 48,460,000 pounds, and it was stated that the crop of the year 1901 was expected to be two-thirds of a normal one. The real amount of that crop was 33,450,500 pounds. During the year 1902 the conditions of the coffee groves were improved, the figures obtained from the collector of customs for the coffee exports and the estimated consumption in the island showing that the amount of the crop for the year 1902 was about 39,650,000 pounds. This last crop was therefore larger than that of the previous year by 6,200,000 pounds, but was still inferior to the estimated normal output by 8,810,000 pounds.

The next crop promises to be an exceptional one and will be probably far above the normal average. The farmers are nevertheless discouraged, as it is feared that the price of this staple will be still lower than for the last years on account of the increased customs duties that coffee will have hereafter to pay at its entrance into France and in Cuba. Many planters state that with the actual prices they hardly can cover the expenses of cultivation, gathering the crop, and preparing it for sale, and think that if the price continues to drop they will be compelled to abandon their plantations. The depression of the coffee industry, of which the people in the coffee districts complain, may be appreciated by comparing the actual value of the annual shipments of coffee with the average for the years preceding 1892:

Average value of annual shipments from 1892 to 1896 .....	\$10, 872, 000
Value of coffee shipped during 1901-2 .....	3, 195, 662
Reduction of value of actual shipments .....	7, 676, 338

As the crop of 1901 amounted only to two-thirds of a normal crop, the value of the annual shipments at the actual prices would be, in the case of a normal crop, \$4,793,493, and the reduction as compared with the former average would be still about \$6,000,000. It is not probable that our coffee will obtain again the extremely high prices that were current in the years previous to 1898, and it is not therefore to

be hoped that the deficit just pointed out in the income of the coffee districts will be altogether filled by any possible increase of the price of this staple, but a reasonable increase, such as the Porto Rican coffee, on account of its superior quality, should be able to obtain in a market where it is not charged with extraordinary duties, would be sufficient to make the business of raising coffee fairly profitable, even under the present conditions of cultivation and management of the plantations. Such improvement of the price will be obtained most probably in a very near future when the Porto Rican coffee, becoming better known in the United States, will have in the American market the sale it deserves. In this connection it is interesting to note that the efforts made by the government and by some individuals in this direction are proving successful. During the fiscal year 1902-3 the shipments of coffee to the United States received quite an impetus, amounting in value to \$718,551, when in fact during the previous fiscal year they amounted only to \$27,031. Cuba has been for many years the market of the low-grade coffee, and some concession from the Cuban Government regarding the customs duties to be paid there by the Porto Rican coffee would be of great benefit to the planters.

On the other hand, in the opinion of agricultural experts, improved methods of raising coffee would allow to have groves yielding per acre two or three times as much as the average obtained with the actual methods. Even the old groves could be made to yield more than they do now by more intelligent and careful cultivation. With such increased yields, coffee culture would be a most profitable industry, even with the actual low prices of the product. The agricultural experiment station at Mayaguez has undertaken a series of experiments about the best methods of raising coffee. These experiments will undoubtedly be in time of great value for the planters. The bulletin, "Shade in coffee culture," by Mr. O. F. Cook, of the United States Department of Agriculture, has been translated into Spanish and distributed by this bureau. This work contains valuable suggestions that will be very useful for the intelligent farmer.

*Tobacco.*—The area planted to tobacco this year was much larger than that of last year, and the yield was normal. It has not been possible to ascertain the amount of the crop, as a large part of it is still unsold on account of the fall in price. This will cause a reduction of the plantations for the next season.

The experiments of cultivation under shade have been a success. The improvement in the quality of the product and the increase in yield are considerable, giving an enormous profit. These plantations under shade will receive some extension in the next season, but not so much as would be desirable, on account of the considerable outlay that they require.

The value of exports of leaf tobacco and cigars have been as follows during the fiscal years 1901-2 and 1902-3:

Years.	Leaf tobacco.	Cigars.
1901-2 .....	\$212,768	\$1,549,235
1902-3 .....	194,857	1,753,917

*Fruits.*—During the past year many acres of land have been planted to oranges, lemons, grape fruits, and other citrus trees. The results so far obtained quite confirm what has been asserted regarding the perfect adaptability of the soils and climate of Porto Rico to the growth of citrus fruits, and especially the orange. The appearance of the plantations is most satisfactory; the trees show to be rapid growers, and those 3 years old from setting have begun to bear fruit. Nurseries are becoming very numerous and can supply the budded trees necessary for setting new groves. The planting of these fruits was at first confined to the vicinity of San Juan, but has later extended to different parts of the island.

Adjuntas, Aguas Buenas, Bayamon, Lajas Manatí, Mayaguez, Naguabo, Ponce, Rio Piedras, Vega Alta are towns in which plantations of some importance have been reported. The inquiries of the bureau have led to record an aggregate of 5,194 acres planted to citrus fruits, but as many farmers have refused to give any information regarding the extent of their groves, that figure is only a part of the actual acreage. Over 10,000 acres is certainly a conservative estimate. During the present year the planting of these fruits has received a great impetus, and many acres of land have been purchased and prepared to be planted this fall, or are under contract for the same purpose.

The value of exportation of oranges to the United States, for the most part from the wild trees existing on the island, has increased considerably during the past fiscal year, rising to \$230,589, while it amounted to only \$51,364 during the previous fiscal year.

Pineapple culture is receiving some development. This is a most promising crop in Porto Rico, but as it does not stand transportation to the United States as well as the orange under the present conditions, it has not received as much attention as the latter. This culture, as well as that of other fruits that are given now only little attention, but that offer enticing possibilities, will in time be developed to a great extent, when special steamers for the transportation of fruits to the United States can be provided.

*Cotton.*—The culture of cotton has awakened great interest all over the island, and about 10,000 acres have been planted to sea-island cotton with seeds that have been distributed for the most part by the Walker Cotton and Industrial Company. The reports regarding this new crop are quite satisfactory. Most of the plants have blossomed, and bear a large number of bolls. The cotton of a little tract planted near Rio Piedras has been gathered and found to be of excellent quality. In two months the bulk of the crop will be gathered, and if the results are as good as everybody expects cotton will be planted all over the island as far as the supply of seed available will allow. The confidence of the farmers in the possibilities of this crop is such that many are willing to plant without delay, and many acres of land prepared have remained unsown for lack of seed.

#### MINES.

During the fiscal year 46 applications for mining concessions were filed, which, together with 7 others that were pending on July 1, 1902, make a total of 53 claims prosecuted in the bureau during the year. Of these 53 claims, 8 were granted, 17 canceled, 6 renounced, and 22 were still pending on June 30, 1903.

The number of mining concessions in force June 30, 1903, was 80. Beside some salt works, no formal work is done in any of those mines. The rent accruing to the insular treasury from these concessions amounts to \$3,900.60.

Very respectfully,

JUAN BTA. RODRIGUEZ,  
*Assistant Commissioner of the Interior,  
Chief Bureau of Agriculture and Mines.*

Hon. W. H. ELLIOTT,  
*Commissioner of the Interior.*

### EXHIBIT D.

#### REPORT OF THE SUPERINTENDENT OF INSULAR TELEGRAPH.

DEPARTMENT OF THE INTERIOR OF PORTO RICO,  
BUREAU OF INSULAR TELEGRAPH,  
*San Juan, P. R., June 30, 1903.*

SIR: In compliance with instructions contained in your letter of March 24, 1903, I have the honor to submit the following report covering the operation, maintenance, and extension of the insular telegraph of Porto Rico for the fiscal year 1902-3.

The work of building new lines, a contract covering the greater portion of which was pending, having been entered into prior to the close of fiscal year 1901-2, was carried out as follows: Utuado-Adjuntas, 22 kilometers (18 kilometers of which were covered by contract); Aguadilla-Lares, 39 kilometers; in all, 61 kilometers, making a total of 1,231 kilometers of line controlled by the bureau of insular telegraph on the date of this report. The construction of 57 kilometers of this new line was paid for out of money carried over from the fiscal year 1901-2. The cost of constructing the remaining 4 kilometers was paid for out of the appropriation for 1902-3.

In addition to the 61 kilometers of new line built, cross arms were placed on poles and all wires entering San Juan were removed from brackets to which they had previously been secured and placed on these cross arms. These improvements, which also included reconstructing the line, were extended for a distance of 14 kilometers, which brought the work to a point near to and south of Rio Piedras. The contract for placing these cross arms, restringing the wire, and all other labor necessary was also pending from the previous year, and the expenditures incurred were paid for out of the funds transferred for this purpose from the fiscal year 1901-2.

The total amount carried over by virtue of the pending contracts and expended for construction and reconstruction work as above mentioned was \$4,424.90.

In view of these contracts for construction work no appropriation for extension of lines was asked for to be applicable during the current fiscal year. However, it

became apparent later that certain improvements were necessary, and it being desired to further extend the lines, for all of which contemplated work the amount appropriated for contingent expenses proved inadequate, and there being an unexpended balance on hand pertaining to other appropriations for the service, which it was found could not very well be used for the purposes appropriated, authority was asked to have transferred such amounts to the appropriation for contingent expenses of the fiscal year 1902-3, to be employed for the purchase of instruments, material, and the building of lines, viz:

Transferred from appropriation for salaries, unexpended balance .....	\$4, 000. 00
Transferred from subappropriation for rent, light, and various small sub-appropriations .....	1, 700. 00
Transferred from "Trust fund, maintenance of insular telegraph, fiscal year 1901-2" .....	1, 244. 29
	<hr/> 6, 944. 29

Of this amount there had been expended at the close of the fiscal year June 30, 1903 (for purchase of poles and extending lines) .....	864. 14
	<hr/>

Leaving amount for purchase of instruments, material, and extension of lines, contracts for which have already been made .....	6, 080. 15
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Some of these transferred funds, already expended, were found necessary to enable this bureau to provide material out of which to build the telegraph line between Utuado and Adjuntas and for the construction of 4 kilometers of line, a stretch which was not provided for by contract, mention of which is made above.

The completion of the Ponce-Arecibo line (which was done by building the 22 kilometers previously referred to) has proved a great benefit to the service at times when traffic has been heavy for points on the southern side of the island, and whenever, on account of interruption, the regular through wires to Ponce become congested it affords an additional outlet. The line from Aguadilla to Lares also adds much to the efficiency of the service, offices having been established at the latter-named place and San Sebastian, both of which are important towns in the coffee-growing district.

Three additional offices were opened during the year, making a total of 32 offices in operation on the lines of this service on June 30, 1903.

The limited number of employees authorized by law and the increase in volume of business making it necessary to increase the operating force at some of the larger offices, precluded the opening of more stations. Had more employees been provided for, especially operators, a number of stations could have been opened which it is believed would have added greatly to the efficiency of this service, and also increased considerably the earnings of the lines.

Repairs to the lines were kept up almost continuously throughout the year. During the months of February, March, April, and May general repair parties having been employed, and as far as stock on hand permitted, all unserviceable material, poles, cross arms, wire, brackets and pins were replaced by new material. These repair parties, besides making extensive repairs, as above mentioned, cut away all vegetation found in contact with the wires as well as that which threatened to give trouble in the near future.

The regular linemen of the service have been kept busy, owing to the great length of their respective sections, removing interruptions from the lines, trimming vegetation, and making such repairs as was possible for them to do.

Increase in the volume of commercial business handled during the year has been gradual, as is shown in the tabulated statement appended hereto. The volume of free business passed over the lines, which is also shown in a statement attached, was considerable, and indicates that this class of telegraph business is also increasing.

Members of the legislature of Porto Rico, by a joint resolution approved March 12, 1903, have been added to the list of those entitled to the free use of the telegraph for all messages relating to official matters or to questions of public interest.

Following is a list of officials and other persons to whom the privilege of sending messages on official business has been extended:

The governor of Porto Rico.

The secretary of state of Porto Rico.

The attorney-general of Porto Rico.

The auditor of Porto Rico.

The treasurer of Porto Rico, officers, and agents.

The commissioner of the interior of Porto Rico.

The commissioner of education of Porto Rico.

Officials of the bureau of public works.

Officials of the superior board of health.  
Officials of the board of charities.  
Judges of the supreme court.  
The marshal of the supreme court.  
Judges of the district court.  
Fiscals of the district court.  
Officers of the insular police.  
Officers of the United States Army and Navy.  
Director of prisons.  
United States Post-Office Department.  
United States district court.  
Justice of the peace.  
Supervisor of elections.  
Members of the legislature of Porto Rico.

Heliographic communication by day and night has been successfully maintained at the points where originally established, between Porto Rico and Vieques, and the service rendered has been efficient.

The instruments employed for heliographic work having proved durable, the cost of maintaining this class of communication is nominal, there being practically no other expense than salaries paid the operators. The amount of carbide used to generate acetylene gas to operate the night instrument being small, and there being no expense for the operation of day instruments, makes this the most economical, and perhaps the best method of communication that could be devised for Vieques, except it be wireless telegraphy. This latter system it is thought would prove highly satisfactory, as by establishing it the present operating force could be reduced, and might therefore prove as economical to maintain as the present method.

Recent demonstrations made here by a representative of one of the American wireless-telegraph companies indicate that their system would give good results over the distance required by this service.

In compliance with instructions from the commissioner of the interior, a telegraph time service for the island has been established by this bureau.

The necessary instruments for keeping time, as well as those devised for its transmission over the wires, were installed at the San Juan office March 1, 1903, on which date this new feature of the service went into effect. Time is sent daily at 12 o'clock noon to all points in Porto Rico at which there is an insular telegraph office. The time used is that of the sixtieth meridian, designated as intercolonial time.

Prior to establishing this time service discrepancies in time in various parts of the island were general, for the reason that there was no standard or authentic means for regulating it. Each municipality relied upon the accuracy of the town clock for its local time, hence the lack of uniformity in timepieces as used throughout Porto Rico.

But few of the employees have been granted a leave of absence since their connection with this bureau. Some sick leaves have been granted, but such leaves have also been few. In order to grant the leave of absence authorized by law to all employees of this bureau an addition to the actual operating force of at least six employees would be required to act as substitutes, for which extra employees no salary has been provided, but for which, in justice, provision should be made.

The school of telegraphy, established June 30, 1902, has been continued and the results obtained up to this time are satisfactory, indeed have surpassed expectations. The majority of students enrolled at the time the school was opened have remained and are well advanced. A number of them have been employed, some as operators, others as assistants and clerks, and so far the work done by them is satisfactory and gives evidence that the students will fulfill, in an efficient manner, the requirements of their positions. The outlook for competent operators in Porto Rico is now brighter than it has been since the organization of this bureau.

Since the school will probably be the means of supplying that which, until recently, appeared to be the chief obstacle in the way of building up and maintaining a reliable telegraph service in Porto Rico, namely, operators, it would seem proper to continue it for at least another year, preparing as many girls for this class of work as the school can accommodate and as may be consistent with the opportunities for future employment. Such action will also be a precaution against possible embarrassment to the service from a lack of employees of this kind.

The cost of maintaining this institution is nominal, the instructor being an operator detailed from the force of the San Juan telegraph office.

It would seem both feasible and proper that the government should, at the next session of the legislature, provide for the extension of the telegraph system of Porto Rico to all towns having 2,000 or more inhabitants.



The necessity for telegraphic communication to all points on the island where mercantile business is carried on, as indicated by inquiries made by merchants and business men residing at such places, is shown by frequent calls for information made at the principal offices as to methods they should adopt to have telegraph stations established. The need of wire communication with such places for the benefit of the insular government was particularly apparent while the recent registration was being conducted and during the period of the elections.

It is believed that under the present improvement in business conditions of the island a complete and reliable means of telegraphic communication is essential for the furtherance of such conditions. It would also seem that the telegraph has gained the confidence of the public and government officials alike and is being relied upon more and more each day as a medium of communication in Porto Rico to all points to which the lines extend. It is therefore fair to assume that by extending the lines to such towns as above mentioned, which are now without telegraphic communication, and which at times can not rely upon the mail or messenger service, owing to the impassable condition of the roads, the telegraph would be patronized and the earnings of the lines proportionately increased.

An examination of the statement of business further on in this report, shows that the earnings of the lines, including free business, for the fiscal year 1902-3, were greater than the amount appropriated for salaries and exceed by \$13,914.46 the total cost of operation and maintenance of the system for the year, while they exceed by \$1,876.45 the total amount expended for all purposes.

The cost of constructing new lines should be considered apart from the expense of operation and maintenance. Such lines when built have their money value, which valuation should be based upon the actual cost of building them, as in the case of other public structures, and be thus considered when estimating the value of the property. The cost of maintaining the lines is nominal.

Aside from the lines now projected but little will remain to be built, except a few short spurs, to complete the system. Therefore the appropriations that will be needed for extension of the lines in the future will be small, and when the work is completed will no longer be required, leaving only the appropriation for operation and maintenance, which cost to the government it is believed will be offset by the earnings of the lines. These latter funds are by law covered into the treasury of Porto Rico.

The total number of paid commercial messages handled for the period July 1, 1902, to June 30, 1903, was 223,675, the tolls on which amounted to \$29,381.11. The number of free messages handled during same period was 63,711, the tolls for which, computed at commercial rate, amounted to \$19,732.96.

A comparison of business for the fiscal year just closed with that of 1901-2 shows an increase in all classes of messages handled as follows: Paid commercial messages, 32,489; tolls on same, \$6,327.04. Free messages, 48,836; tolls on same, computed at commercial rate, \$10,246.08.

The budget for the current fiscal year authorized and provided salaries for 65 employees, exclusive of those employed at the office of the superintendent, as follows: Managers and operators, 43; clerks, 2; linemen, 7; messengers, 13.

At the close of the period covered by this report there were 63 persons employed, as follows: Managers and operators, 42; clerks, 2; linemen, 7; messengers, 12. Of this number 10 were Americans.

With but few exceptions the work performed by all employees in their respective capacities has been satisfactory, and in many cases, I am glad to be able to state, increased efficiency is shown.

The following statement will serve to give an approximate value of the insular telegraph system, including only lines in operation, all line material not in use, as well as the reserve stock of instruments, tools, and battery material. The estimated value of the lines is based upon the amount it would cost to duplicate the system, and the value of all material, instruments, and tools are given at what they actually cost delivered in Porto Rico:

Lines aggregating 900 kilometers of wire, estimated value.....	\$102,455.92
Telegraph instruments and battery material in use, actual cost.....	2,187.95
Heliographs in use, actual cost.....	588.00
Telegraph instruments and battery material in reserve, actual cost.....	3,862.46
Heliographs in reserve, actual cost.....	313.00
Tools in use and in reserve, actual cost.....	505.80
Line material in reserve, including poles, wire, cross-arms, pins, brackets, lag screws, and insulators, actual cost.....	5,851.30
Total value of lines, etc.....	115,764.43

In addition to lines mentioned above there are belonging to this service a number of short lines mostly in bad state of repair and not now in operation. These lines aggregate in length 331 kilometers of wire; their value is considered nominal, and for that reason has not been estimated nor included in above statement.

*Statement showing number of commercial messages handled, cash receipts for tolls on messages, number of free messages handled, and value of tolls on free messages, computed at commercial rate, for each month of the fiscal year 1902-3.*

Month.	Commercial messages.	Cash receipts from telegrams.	Number of free messages handled.	Value of free messages.
July.....	19,110	\$2,288.82	3,794	\$782.72
August.....	16,708	1,966.07	3,609	858.76
September.....	17,323	2,308.02	3,821	1,025.60
October.....	20,882	3,099.17	12,170	3,913.52
November.....	17,223	2,293.04	6,991	2,370.86
December.....	18,035	2,397.00	4,801	1,376.78
January.....	19,329	2,543.88	4,717	1,399.04
February.....	18,009	2,364.83	4,129	1,346.16
March.....	20,603	2,730.94	4,818	1,600.00
April.....	19,305	2,556.52	5,136	1,750.00
May.....	19,563	2,570.42	4,711	1,647.50
June.....	17,585	2,262.40	5,014	1,661.82
Total.....	223,675	29,381.11	63,711	19,732.96

*Statement showing amounts appropriated for bureau of insular telegraph during the fiscal year 1902-3 and amounts expended under these appropriations during same period.*

Amount appropriated for all purposes, fiscal year 1902-3.....	\$41,590.00
Carried over account of pending contract, fiscal year 1901-2....	4,424.90
Amount transferred from "trust fund," fiscal year 1901-2....	1,244.29
Total.....	<u>\$47,259.19</u>

Amount expended, including salaries, per diem allowance, repairing and building lines, light and rent of offices; purchase of instruments, line and battery material; transportation and incidentals.....	47,238.62
Unexpended portion of appropriation covered back into insular treasury.....	20.57
Total.....	<u>47,259.19</u>

*Statement showing receipts from insular telegraph lines, the cost of maintenance and repair of the lines, and earnings over and above operating expenses during the fiscal year 1902-3.*

Cash receipts from tolls on messages.....	\$29,381.11
Value of free messages, computed at commercial rate.....	19,732.96
Total earnings of lines.....	<u>\$49,114.07</u>
Expended for salaries.....	32,851.19
Expended for rent of offices.....	685.44
Expended for lighting stations.....	149.00
Expended for repairs to lines, including purchase of poles, transportation of all kinds pertaining to operation and maintenance, and per diem allowance paid employees while traveling.....	602.04
Estimated cost of other line and battery material used, including carbide used for heliographs.....	911.94
Total cost of operation and maintenance.....	<u>35,199.61</u>
Earnings of lines over and above cost of operation and maintenance.....	<u>13,914.46</u>
Respectfully submitted.	

L. G. MCGUIGAN,  
Superintendent of Insular Telegraph.

Hon. WM. H. ELLIOTT,  
Commissioner of the Interior.

## EXHIBIT E.

## REPORT OF THE CHIEF OF THE BUREAU OF DOCKS AND HARBORS.

DEPARTMENT OF THE INTERIOR,  
BUREAU OF DOCKS AND HARBORS,  
*San Juan, P. R., July 7, 1903.*

SIR: I have the honor to submit the following report of the work of the bureau of docks and harbors for the fiscal year ending June 30, 1903:

The legislature of 1902 provided for a bureau of docks and harbors which should have charge of all matters relative to the harbors and docks and harbor shores of the ports of the island.

The commissioner of the interior was empowered, with the approval of the executive council, to establish and enforce rules and regulations in relation to the policing and the use of the harbors and docks and harbor shores; to prescribe the fees and charges for pilotage, inspections, surveys, dockage, and wharfage, to enforce their collection, and to provide penalties for infractions of any such rules and regulations, which penalties, when approved by the executive council, would have the force of law and be cognizable in the district courts of the island.

All moneys collected under the rules and regulations were to be paid into the insular treasury and accounted for under such rules and regulations as should be prescribed by the auditor.

The legislature further provided that the schedule of fees and charges should remain in force only for a period of one year, unless sooner repealed.

In November of 1901 the governor appointed Mr. C. H. Tingle captain of the port of San Juan and directed him to report to the commissioner of the interior. No fees at this time had been prescribed, and consequently none were collected.

Certain rules and regulations were adopted, which took effect February 1, 1902. These rules and regulations defined the powers and duty of the captain of the port, provided for the proper policing and regulating of the harbor, and prescribed penalties for the violation of the rules.

A schedule of fees and charges for the wharves, docks, and shore lines were also adopted, and fees for pilotage fixed. No collections seemed to have been made under these rules and regulations until April, 1902. The present existing rules and regulations as amended have been in force since April 1, 1902.

I was appointed chief of the bureau of docks and harbors June 26, 1902, and, under instructions contained in your letter dated June 27, 1902, my first official duty was to proceed to Mayaguez for the purpose of taking possession of certain insular property which had formerly been in charge of the harbor works and which was at this time in possession of the municipality of Mayaguez, and for the further purpose of putting harbor rules and regulations in force at said port.

The first part of this duty was performed by formally receiving possession of the property from the mayor as the representative of the city, and receipting to him for the same.

The rules and regulations were put in force and on July 1, 1902, I recommended Mr. Emiliano Zeruto Benite for the position of captain of the port of Mayaguez at a salary of \$600 per annum. This recommendation was approved and Mr. Zeruto was appointed. Subsequently it was found necessary to accept Mr. Zeruto's resignation, and on July 23, 1902, the present incumbent, Mr. Ramon Brandes, was appointed.

On August 1, 1902, I recommended the appointment of Mr. P. Edelmuero Martinez for the position of captain of the port of Ponce at a salary of \$1,000 per annum. The recommendation was approved and the appointment made.

The collections, as provided for by the rules and regulations, have been carried on and monthly statements of the receipts and disbursements of the bureau of docks and harbors have been made to the auditor.

Prior to the organization of the bureau it had seemed best to provide some vehicle for the official use of the captain of the port in the discharge of his duties as well as to furnish the governor some means of transportation in and about the harbor of San Juan, and the launch *Hermes* was purchased. Repairs on this launch have been made, as shown by statements of disbursement, and she is at present in first-class condition, capable of serving the government for many years. She was purchased at a price far below her real value, and the investment has been a profitable one.

The expenses incident to the organization of the bureau would seem to have been large, but at the present time the minimum amount is being expended as "expense of management."

In his message to the second session of the legislature the governor hoped that the

revenues to be derived from the port of San Juan would exceed \$15,000. I submit here a statement of the receipts and disbursements of the ports of San Juan, Ponce, and Mayaguez, for the entire fiscal year ending June 30, 1903:

Receipts .....	\$25,362.68
Disbursements .....	18,218.88
Available balance .....	7,143.80

These receipts are from various sources, but principally collected under those sections which provide for a charge against the gross tonnage of vessels using the public property, i. e., the wharf, bulkhead, pier, or shore line to load or unload cargo.

It will be seen by this that the collections have more than met expectations, and that the bureau had on hand July 1 a comfortable balance for use in repair works.

During the past year the bureau has expended various sums of money in the repair of the bulkhead of San Juan Harbor; the entire bulkhead should be looked over, and several thousand dollars expended upon it if it is the intention of the island government to preserve that form of water-front improvement. It will also be necessary to dredge along the entire length and immediately in front of the bulkhead in order that vessels of any considerable draft may be accommodated.

The bureau has also built a wharf for the landing of passengers and baggage in the harbor of Ponce at an expense of about \$1,000. This was a much needed improvement and one which seems to have met with the approval of the people of Ponce. There is very little which can be done to improve the water front of the Ponce Harbor. You are confronted with almost an open roadway, and unless the General Government should build, at an enormous expense, a breakwater, it is practically impossible to secure quiet water in the Ponce Harbor.

At Mayaguez the bureau has expended upon the present wharf for the unloading of merchandise about \$2,000, and it is in first-class condition. A small amount will have to be expended upon the small wharf which is used for the landing of passengers and baggage.

With the increase of the commerce of the island, by far the majority of which enters and departs from the port of San Juan, the question arises as to what is the most judicious development of the water front.

Two plans present themselves: Either to extend the present bulkhead easterly toward San Antonio bridge, which would permit vessels to berth by simply lying alongside, or, and to my mind much the better plan, build piers at right angles with the present bulkhead. In an open harbor, such as the San Juan Harbor is, the building of piers certainly recommends itself.

I transmit herewith a statement showing the number, nationality, and character of all vessels which have entered the ports of San Juan, Ponce, and Mayaguez during the last fiscal year. This statement shows clearly the demands which are made upon the harbor of San Juan.

## PORT OF SAN JUAN.

	Number of ves- sels.	Tonnage.
American, steam .....	167	513,989
Foreign, steam .....	122	383,328
American, sail .....	36	25,632
Foreign, sail .....	21	4,279
United States Government vessels .....	155	.....
Foreign government vessels .....	9	.....

This makes a total of 510 vessels occupying the harbor of San Juan during the year. Total number of days consumed was 1,935, or almost an average of four days to the vessel.

## PORT OF PONCE.

	Number of ves- sels.	Tonnage.
American, steam .....	80	236,435
Foreign, steam .....	95	233,735
American, sail .....	26	13,231
Foreign, sail .....	39	6,519
Total number of vessels .....	240	.....

Total number of days in harbor, 534.

## PORT OF MAYAGUEZ.

American, steam .....	64	197,406
Foreign, steam .....	76	165,805
American, sail .....	20	8,626
Foreign, sail .....	22	4,952
Total number of vessels .....	182	.....

Total number of days, 406.

This statement does not include, unfortunately, the visits of the vessels exclusively in the coastwise trade of the island of Porto Rico. Of these we have 3 small steamers and 42 sailing vessels ranging from 25 tons to 100 tons. These vessels make constant trips around the island and occupy berths in the San Juan harbor from five to eight days in each month.

The average length of the ocean steamers visiting the San Juan Harbor is from 300 to 500 feet.

The average length of the sailing vessels is about 200 feet.

The length of the bulkhead wall is 2,074 feet.

By this it will readily be seen that six steamers requiring 350 feet each will occupy the entire bulkhead.

Four steamers and two sailing vessels will use the entire available space of the bulkhead.

It is not an uncommon occurrence to have a greater number of vessels than this desiring berths simultaneously. Under the present conditions it is impossible to grant them berth at the bulkhead, and they are forced to discharge and take on cargo in the stream by means of lighters.

On Christmas, 1902, there were 42 vessels in the harbor of San Juan and every one which was not lying in a berth at the bulkhead was swinging at a single anchor chain.

It is hardly necessary for me to enter into a detailed statement as to how the present conditions of the water front could best be improved. The island government is in possession of reports from prominent and competent engineers who are, no doubt, far more able to advance a correct theory than I am.

The extension of the present bulkhead easterly toward San Antonio bridge would entail a great amount of dredging in order to secure a sufficient width for large vessels, and even at best it would be an exceedingly inconvenient harbor to enter and leave and would require the landing of cargo at points far removed from the business center of San Juan.

It seems to be the consensus of opinion that the extension of the bulkhead is not properly feasible.

This conclusion leads to the adoption of the development of the water front by the use of piers.

Two covered piers 100 feet wide, 150 feet apart, in order to permit a vessel to concurrently receive or discharge cargo from the pier, as well as to vessels lying between them, are needed. These piers would occupy a very small amount of the bulkhead space and would permit of the use of the remainder for berthing vessels. In this manner the maximum number of vessels could be accommodated.

## THE PIER AS A REVENUE PRODUCER.

In this connection I have the honor to quote a portion of a report made under date December 17, 1902:

"I would most respectfully recommend the building of two piers at a point just

west of that space known at present as the quartermaster's dock. These piers would cost, in round numbers, \$190,000.

"This would leave a sufficient length of the present bulkhead to care for such vessels as carried heavy cargoes, such as coal, lumber, etc., which cargoes would not in any event be desired upon the piers.

"In defense of this expenditure of money I have to urge that a wharfage fee could be charged. Such a fee is charged in every port where such landing facilities are afforded to shipping.

"With such a plan in view it is well to consider the amount of cargo which is imported into and exported from the port of San Juan. Fees of such character are usually charged against each individual package. The word 'package' is held to be of a weight of 200 pounds, or occupying about 6 cubic feet of space.

"There has been imported into and exported from the port of San Juan for the ten months of 1902 ending October 31, 1,569,744 packages. A wharfage fee on that number of packages at the average rate of 3 cents per package would produce a revenue to the island for ten months of \$47,092.32, and for one year \$56,510.78.

"In this connection it may be added that of that amount of cargo certainly a large quantity would be left upon the piers for a period of time longer than the time prescribed for the removal of goods, and upon this, storage should be charged and collected.

"I may also add that I have not taken into consideration the amount of cargo which is brought around by the coastwise vessels and transhipped, of which a certain amount would be unloaded upon the piers, and upon which a wharfage fee should be collected.

"The building of two such piers would provide ample berth space for all vessels, and would permit the unloading and loading of cargo under roof. These piers could be used constructively as warehouses, and merchants would take warehouse receipts for cargo deposited for exportation, which receipts would be negotiable at the bank. In fact, they would provide such facilities for shipping as are found in every port of the importance of San Juan."

An estimate submitted by competent engineers shows that the entire harbor of San Juan could be dredged for about \$325,000.

Application should be made to the War Department for a preliminary survey by Government engineers as to the cost of this work. This could certainly be secured. Then a strong movement should be made to secure from Congress the necessary appropriation. The Federal Government has so far not seen fit to expend a cent upon this harbor. The constantly increasing use of the harbor of San Juan, not only by commercial, but by Government vessels, makes the matter of dredging most imperative.

In closing this report I have to say that about April 15 it was found necessary, for reasons with which you are already familiar, to accept the resignation of Mr. C. H. Tingle as captain of the port of San Juan, and Mr. James A. Stevenson was appointed in his stead. I desire to further add that the work of all the employees of the bureau of docks and harbors in the different ports where the rules and regulations are in force has been both zealous and intelligent. At the present time the most pleasant relations exist between our captains of the different ports and the importers and shippers with whom they come in daily contact. They are certainly to be commended for good work.

It is to be hoped that in the coming year the Federal Government can be prevailed upon to perform some of the work so much needed in the harbor of San Juan, and that our own legislature can be induced to set aside such moneys as will be necessary to provide proper shipping facilities, which certainly come under the head of permanent improvements.

Respectfully submitted.

TOM M. COOKE,  
*Chief of the Bureau of Docks and Harbors.*

HON. WM. H. ELLIOTT,  
*Commissioner of the Interior.*

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